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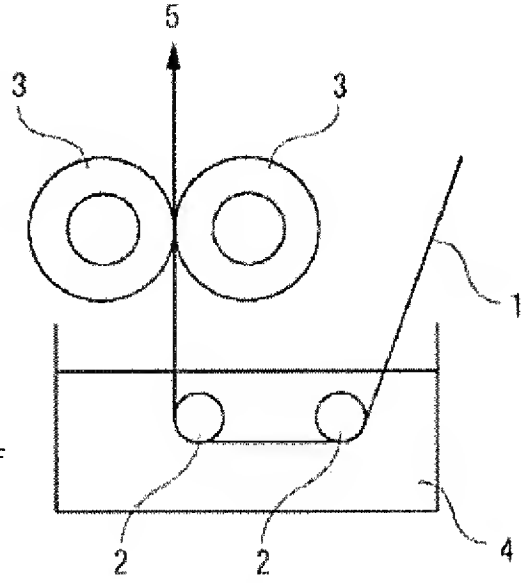
(54) EMULSION COMPOSITION FOR FORMING SILICONE RUBBER FOR COVERING AND IMPREGNATION-TREATING FIBROUS SUBSTRATE MATERIAL, AND METHOD FOR PRODUCING COATED AND IMPREGNATION-TREATED FIBROUS SUBSTRATE MATERIAL WITH SILICONE RUBBER

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an emulsion composition for forming a silicone rubber easy for covering and impregnation-treating a fibrous substrate material, closely adhering the silicone rubber film well with fibers and giving the fibrous substrate material excellent in bundling property among the fibers, and a method for producing such the fibrous substrate material.
SOLUTION: This emulsion composition for forming the silicone rubber for covering and impregnation-treating the fibrous substrate material is provided by consisting of a liquid state silicone rubber base consisting of (A) a liquid state alkenyl group-containing diorganopolysiloxane and (B) a reinforcing silica filler, (F) a liquid state diorganopolysiloxane having blocked silanol groups in both of its terminals, (C) water containing smectite clay, (D) a nonionic surfactant having ≥10 HLB value, (E1) an organopolysiloxane containing hydrogen atoms bonding with a silicon atoms and (E2) a platinum-based catalyst, and having 50 to 3,000 mPa s viscosity. The method for producing the coated and impregnation-treated fibrous substrate material with the silicone rubber by treating the fibrous substrate material with the composition is also provided.



* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]
(A) A liquid silicone rubber base which consists of liquefied diorganopolysiloxane 100 weight section, and (B) reinforcement nature silica filler 5 - 60 weight sections which have at least two silicon atom joint alkenyl groups in one molecule, (F) Zero to both-ends silanol group blockade diorganopolysiloxane 15 liquefied weight section, (C) The non-ion system surface-active agent 1 whose 80 to water 250 weight section containing smectite clay and (D) HLB value are ten or more - nine weight sections, And it consists of organopolysiloxane and a platinum (E2) system catalyst which have at least two silicon atom absorbed water matter atoms in one (E1) molecule of sufficient quantity for making the (E) ingredient (A) construct a bridge, Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material characterized by viscosity being 50 - 3,000 mPa-s in 25 **.
[Claim 2]
Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material according to claim 1, wherein viscosity (however, apparent viscosity when it measures with revolving speed of 62.5 rpm in 25 ** with a rotary type cylinder viscosity meter) of an ingredient (C) is 40 - 30,000 mPa-s.
[Claim 3]
Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material according to claim 2, wherein an ingredient (C) is what carries out 0.5-3 weight-section content of the smectite clay per water 100 weight section.
[Claim 4]
An alkenyl group in an ingredient (A) is a vinyl group, and a residual organic group is a methyl group, Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material according to claim 1, wherein an ingredient (F) is both-ends silanol group blockade dimethylpolysiloxane and an ingredient (B) is a hydrophobing reinforcement nature silica filler.
[Claim 5]
Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material according to claim 1, wherein non-ion system surface-active agents of an ingredient (D) are polyoxyethylene alkyl ether.
[Claim 6]
A manufacturing method of a fiber base material which was carried out with silicone rubber as for covering and impregnation treatment covering and impregnating Claim 1 - a silicone rubber plasticity emulsion constituent of Claim 5 given in any 1 clause, removing moisture to a fiber base material, and making it harden this constituent.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Field of the Invention]
[0001]
This invention relates addition reaction hardening type the silicone rubber plasticity emulsion constituent and fiber base material for covering and impregnation treatment of a fiber base material to covering and the manufacturing method of a fiber base material by which impregnation treatment was carried out with covering and silicone rubber by carrying out impregnation treatment with this silicone rubber plasticity emulsion constituent.
[Background of the Invention]
[0002]
The method of manufacturing silicone rubber covering textiles is more publicly known in ancient times by coating textiles with the silicone rubber coating agent which consists of diorganopolysiloxane crude rubber, a reinforcement nature silica filler, organic peroxide, an organic solvent, etc., heating it, and stiffening it. However, the organic solvent is harmful to a human body, and since there is danger of a fire, the coating agent which consists of a silicone aqueous emulsion is proposed. For example, it has at least two silicon atom joint alkenyl groups in the (A) monad, The viscosity at 25 ** Organopolysiloxane of 300 or more centistokes, (B) The ORGANO hydrogen polysiloxane which contains in a monad three or more hydrogen atoms combined with the silicon atom, (C) The air bag coated with the coating composition for air bags and silicone rubber which consist of a silicone aqueous emulsion prepared by emulsion-izing a compound including a curing catalyst in the bottom of existence of an emulsifier and water is indicated by JP,5-202338,A, alpha, omega-divinyl-ized polyorganosiloxane oil, the polyorganosiloxane oil containing **SiH, The method of covering with a silicone elastomer is indicated in the ** table 2005-530053 by coating a structural textile with the emulsion which emulsified in water the polyaddition catalyst etc. which consist of an adhesion accelerator and a platinum metal, heating it, and stiffening it.
[0003]
The aquosity polyorganosiloxane emulsion which can construct a bridge over an elastomer by the polyaddition reaction for making weaving or the nature base material of non-woven textile impregnate, Namely, alpha, omega-divinyl-ized polyorganosiloxane oil, polyorganosiloxane oil containing **SiH, The method of using it for the emulsion which emulsified in water the polyaddition catalyst etc. which consist of an adhesion accelerator and a platinum metal, and fiber base material covering of this emulsion is indicated in the ** table 2005-530052. However, there is a problem that the above-mentioned coating has insufficient fray-proof nature, and there are a silicone elastomer and a feeling of adhesion peculiar to silicone rubber.
[0004]
On the other hand, the method of manufacturing a silicone elastomer from an aquosity silicone emulsion and the aquosity silicone emulsion for it are indicated by JP,2004-346248,A, and

International-Publication WO2004/104105. In them, vinyl group content diorganopolysiloxane, the ORGANO hydrogen polysiloxane, The emulsion constituent for silicone rubber which consists of a platinum system catalyst, water containing smectite clay, an emulsifier, etc., The manufacturing method and this emulsion constituent for silicone rubber are heated and stiffened, and the method of forming low-specific-gravity silicone rubber and sponge-like (porosity) silicone rubber is taught by subsequently drying.
It is indicated that the silicone rubber obtained in this way is useful to the object for mold goods, the object for coating, and printing.

[0005]
the emulsion constituent for these silicone rubber, this invention persons, -- various fiber base materials (for example, textiles.) Apply to knitting, a braid, and a nonwoven fabric with a spray, a knife coat, brush printing, or a roll coat, when dry removal of the moisture is carried out with heating and it is made to harden, can make a silicone rubber coat form on a fiber base material, but. He has noticed that the emulsion constituent for silicone rubber hardly permeates in a fiber base material for a ********** reason, but remains in surface coating.
[0006]
Then, although the dip-coating method was tried, this emulsion constituent for silicone rubber is thixotropic, its perviousness into a fiber base material is low because of hyperviscosity, and, moreover, a lot of emulsions adhere to a fiber base material after immersion. Therefore, if a silicone rubber coat cannot fully stick to a fiber base material, and cannot fully band together with silicone rubber in fiber but carries out repetition friction, cover printing, bending, etc., A cut end with an edged tool is frayed [that a silicone rubber coat separates easily and between fiber is frayed easily, especially] easily, In the diaphragm by the nip roll which is the post process, he could not reduce substantially the amount of superintendent officers to the fiber base material, but has noticed that there is a problem of spoiling the original aesthetic property and pliability of a fiber base material. This emulsion constituent for silicone rubber is thixotropic, and he has noticed that there is a problem that the dripping piece nature from a nip roll is bad, and cannot carry out dip coating of the fiber base material continuously for a long time for hyperviscosity.
[0007]
[Patent documents 1] JP,H5-202338,A
[Patent documents 2] JP,2005-530053,A
[Patent documents 3] JP,2005-530052,A
[Patent documents 4] JP,2004-346248,A
[Patent documents 5] International-Publication WO2004/104105
[Description of the Invention]
[Problem to be solved by the invention]
[0008]
The purpose of this invention is the above-mentioned problem to cancel, and specifically, Viscosity is low, mobility is high and impregnation treatment is efficiently possible continuously to the inside of fiber base materials, such as textiles, knitting, a braid, and a nonwoven fabric, And the silicone rubber coat formed by carrying out dry removal and stiffening moisture is well stuck for fiber, It excels in the unity between fiber, and is hard to be frayed, and a cut end especially with an edged tool cannot be frayed easily, The silicone rubber plasticity emulsion constituent that the obtained fiber base material is flexible, And a fiber surface is covered with a silicone rubber coat, and between fiber bands together firmly with silicone rubber, It is in providing the method of manufacturing the fiber base material in which a silicone rubber coat does not separate easily even if it carries out repetition friction, cover printing, bending, etc., between fiber cannot be frayed easily, and a cut end especially with an edged tool cannot be frayed easily.
[Means for solving problem]

[0009]
This invention,
" [1] A liquid silicone rubber base which consists of liquefied diorganopolysiloxane 100 weight section, and (B) reinforcement nature silica filler 5 - 60 weight sections which have at least two silicon atom joint alkenyl groups in the (A) one molecule, (F) Zero to both-ends silanol group blockade diorganopolysiloxane 15 liquefied weight section, (C) The non-ion system surface-active agent 1 whose 80 to water 250 weight section containing smectite clay and (D) HLB value are ten or more - nine weight sections, And it consists of organopolysiloxane and a platinum (E2) system catalyst which have at least two silicon atom absorbed water matter atoms in one (E1) molecule of sufficient quantity for making the (E) ingredient (A) construct a bridge, Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material characterized by viscosity being 50 - 3,000 mPa-s in 25 **.
[2] . It is characterized by viscosity (however, apparent viscosity when it measures with revolving speed of 62.5 rpm in 25 ** with a rotary type cylinder viscosity meter) of an ingredient (C) being 40 - 30,000 mPa-s. [1] Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material of a description.
[3] Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material given in [2], wherein an ingredient (C) is what carries out 0.5-3 weight-section content of the smectite clay per water 100 weight section.
[4] The alkenyl group in an ingredient (A) is a vinyl group, and a residual organic group is a methyl group, Covering and the silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material given in [1], wherein an ingredient (F) is both-ends silanol group blockade dimethylpolysiloxane and an ingredient (B) is a hydrophobing reinforcement nature silica filler.
[5] covering and silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material given in [1], wherein the non-ion system surface-active agents of an ingredient (D) are polyoxyethylene alkyl ether. " -- it is related.
The alkenyl group in [1 [4-]] "ingredient (A) is a vinyl group, A residual organic group is a methyl group and an ingredient (F) is both-ends silanol group blockade dimethylpolysiloxane, . It is characterized by an ingredient (B) being a hydrophobing reinforcement nature silica filler. [2] Or covering and the silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material given in [3], and covering and silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material of [2], [3], [4], or [4-1] description, wherein the non-ion system surface-active agents of [5-1] ingredient (D) are polyoxyethylene alkyl ether. " -- it is related.
[0010]
This invention,
It is related with "[6] Manufacturing method of a fiber base material which was carried out with silicone rubber as for covering and impregnation treatment covering and impregnating a silicone rubber plasticity emulsion constituent given in either of [1] - [5], removing moisture to a fiber base material, and making it harden this constituent."
It is related with "[1 [6-]] Manufacturing method of a fiber base material which was carried out with silicone rubber as for covering and impregnation treatment covering and impregnating a silicone rubber plasticity emulsion constituent given in [4-1] or [5-1], removing moisture to a fiber base material, and making it harden this constituent."
[Effect of the Invention]
[0011]
Covering and the silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material of this invention, Viscosity is low, mobility is high and impregnation treatment is efficiently possible continuously to the inside of fiber base materials, such as textiles, knitting, a braid, and a nonwoven fabric, And the silicone rubber coat formed by carrying out dry removal and

stiffening moisture is well stuck for fiber, and it excels in the unity between fiber, even if it carries out repetition friction, cover printing, bending, etc., a silicone rubber coat does not separate easily, between fiber cannot be frayed easily, and a cut end especially with an edged tool cannot be frayed easily. Covering and the fiber base material by which impregnation treatment was carried out are flexible at this silicone rubber.
Even if according to the manufacturing method of this invention it is covered with a silicone rubber coat, between fiber bands together firmly with silicone rubber and a fiber surface carries out repetition friction, cover printing, bending, etc., Covering and the fiber base material by which impregnation treatment was carried out can be continuously manufactured efficiently with silicone rubber [say / that a silicone rubber coat does not separate easily, between fiber cannot be frayed easily, and a cut end especially with an edged tool cannot be frayed easily].
[Best Mode of Carrying Out the Invention]
[0012]
Covering and the silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material of this invention,
(A) The liquid silicone rubber base which consists of liquefied diorganopolysiloxane 100 weight section, and (B) reinforcement nature silica filler 5 - 60 weight sections which have at least two silicon atom joint alkenyl groups in one molecule, (F) Zero to both-ends silanol group blockade diorganopolysiloxane 15 liquefied weight section, (C) The non-ion system surface-active agent 1 whose 80 to water 250 weight section containing smectite clay and (D) HLB value are ten or more - nine weight sections, And it consists of organopolysiloxane and the platinum (E2) system catalyst which have at least two silicon atom absorbed water matter atoms in one (E1) molecule of sufficient quantity for making the (E) ingredient (A) construct a bridge, and is characterized by viscosity being 50 - 3,000 mPa-s in 25 **.
[0013]
(A) The liquefied diorganopolysiloxane which contains at least two alkenyl groups in one molecule constructs a bridge with the organopolysiloxane which has at least two silicon atom absorbed water matter atoms in one (E1) molecule by the catalysis of a platinum (E2) system catalyst, and becomes rubber-like. The alkenyl group in an ingredient (A) and the silicon atom absorbed water matter atom in an ingredient (E1) carry out an addition reaction, construct a bridge, and become rubber-like.
[0014]
(A) As an alkenyl group in the liquefied diorganopolysiloxane which has at least two alkenyl groups in one molecule, although a vinyl group, an allyl group, a propenyl group, and a hexenyl group are illustrated, the point of the ease of manufacture and bridge construction ease to a vinyl group is preferred. As organic groups other than the alkenyl group linking directly to a silicon atom, a methyl group; ethyl group, Alkyl groups, such as a propyl group and a hexyl group; although alkyl halide groups, such as aryl group;3,3,3-triphloropropyl groups, such as a phenyl group and a tolyl group, and 3-chloropropyl group, are illustrated, the point of the ease of manufacture to a methyl group is preferred. Although the molecular structure for Motoshige may be any of straight chain shape and the straight chain shape which has branching, straight chain shape is preferred. In a liquid silicone rubber base, the molecular weight and viscosity for Motoshige will not be limited by operation of an ingredient (D), especially if emulsification in an ingredient (C) is possible. The amount of Motoshige is liquefied in ordinary temperature in respect of emulsification ease, it is preferred that the viscosity at 25 ** is 100 - 100,000 mPa-s, and it is more preferred that it is 1,000 - 50,000 mPa-s.
[0015]
Dimethylpolysiloxane of a both-ends dimethylvinyl siloxy group blockade liquefied at ordinary temperature as this ingredient (A), A methyl alkyl polysiloxane, a dimethylsiloxane methylvinyl siloxane copolymer, A methylvinyl polysiloxane, a dimethylsiloxane methylphenyl siloxane copolymer, A methylphenyl polysiloxane, a methyl(3,3,3-trifluoropropyl) polysiloxane; The dimethylsiloxane methylvinyl siloxane copolymer of a both-ends trimethylsiloxy group blockade, A methylvinyl

polysiloxane, a dimethylsiloxane methylvinyl siloxane methylphenyl siloxane copolymer; The dimethylsiloxane methylvinyl siloxane copolymer of a both-ends dimethylhydroxy siloxy group blockade, A methylvinyl polysiloxane, a dimethylsiloxane methylvinyl siloxane methylphenyl siloxane copolymer; dimethylpolysiloxane of a both-ends methylvinyl siloxy group or a bird vinyl siloxy group blockade is illustrated. Two or more sorts of above-mentioned diorganopolysiloxane may be combined.

[0016]

(B) A reinforcement nature silica filler thickens an emulsion constituent, and raises the mechanical strength of the silicone rubber produced [make / easy to carry out / impregnation covering of the fiber base material] by hardening. (B) 5-60 weight-section combination of the reinforcement nature silica filler is carried out per ingredient (A) 100 weight section. Since a thickening action and a mechanical-strength improving action change with the kind of reinforcement nature silica filler, specific surface area, bulk density, etc., A mixture with an ingredient (A) has paste state thru/or preferred loadings which are creamed at ordinary temperature, and it is preferred to carry out 10-40 weight-section combination per ingredient (A) 100 weight section as a rule of thumb. As such a reinforcement nature silica filler, a reinforcement nature silica filler like fumed silica, sedimentation nature silica, and aerogel is illustrated. 100-350-m^2/g is preferred for the specific surface area of fumed silica and sedimentation nature silica. What carried out hydrophobing processing of the reinforcement nature silica filler with organic silicon compounds, such as trimethylchlorosilane, dimethyldichlorosilane, hexamethyldisilazane, and octamethylcyclotetrasiloxane, is especially preferred.

[0017]

(B) Since it will become easy to carry out emulsification dispersion of it into an ingredient (C) if a reinforcement nature silica filler is beforehand mixed with an ingredient (A) and is made into the form of a liquid silicone rubber base, it is preferred.

A liquid silicone rubber base can be easily manufactured by mixing until it supplies an ingredient (A) and an ingredient (B) to a mixer and becomes uniform. In that case, heating is preferred. When an ingredient (B) is a hydrophilic silica filler, Hexamethyldisilazane, octamethylcyclotetrasiloxane, both-ends silanol group blockade diorganopolysiloxane of hypoviscosity. for example, the viscosity at 25 ** -- both-ends silanol group blockade dimethylpolysiloxane of 50 - 100 mPa-s. It is preferred to use together reactive organosilicon compounds, such as a both-ends silanol group blockade methylvinyl polysiloxane and a both-ends silanol group blockade methylphenyl polysiloxane, and to carry out hydrophobing of the reinforcement nature silica filler.

[0018]

The ORGANO hydrogen polysiloxane which has at least two silicon atom absorbed water matter atoms in one (E1) molecule in an ingredient (E) is a cross linking agent of an ingredient (A). The silicon atom absorbed water matter atom adds to the silicon atom joint alkenyl group in an ingredient (A), makes an ingredient (A) construct a bridge, and makes it harden by operation of the platinum (E2) system catalyst in an ingredient (E). When an ingredient (A) has two alkenyl groups in one molecule, an ingredient (E1) needs to have three or more silicon atom absorbed water matter atoms in one molecule. As a silicon atom joint organic group in an ingredient (E1), alkyl halide groups, such as aryl group;3, such as alkyl-group; phenyl group [, such as a methyl group, an ethyl group, a propyl group, and a hexyl group,] and tolyl group, 3, and 3-triphloropropyl group and 3-chloropropyl group, are illustrated. It is preferred to silicon atom joint be an organic group of an ingredient (A) and that it is the same or of the same kind, for example, when organic groups other than the silicon atom joint alkenyl group in an ingredient (A) are methyl groups, it is preferred that the silicon atom joint organic group in an ingredient (E1) is also a methyl group.

Any of straight chain shape, branched, annular, and mesh shape may be sufficient as the molecular structure of an ingredient (E1). Especially if the degree of polymerization of an ingredient (E1) is two or more, it will not be limited, but it is preferred that the viscosity at 25 ** is 3 - 10,000 mPa-s.

[0019]
The compounding ratio of an ingredient (A) and an ingredient (E1) has a preferred quantity that the mole ratio of the silicon atom joint alkenyl group in the silicon atom absorbed water matter atom in an ingredient (E1) and an ingredient (A) becomes - (0.5:1) (10:1), and its quantity which becomes - (0.8:1) (5:1) is more preferred. This is because the hardness of a hardened material may become high too much and hydrogen gas may generate after hardening, when larger [if a mole ratio is smaller than 0.5, good hardenability will be hard to be acquired, and] than 10.
[0020]
(E2) A platinum system catalyst is a catalyst for the silicon atom absorbed water matter atom in an ingredient (E1) to add to the silicon atom joint alkenyl group in an ingredient (A), make an ingredient (A) construct a bridge, and make it harden. In this, the olefin complex of platinum impalpable powder, platinum black, chloroplatinic acid, and chloroplatinic acid, Chloroplatinic acid, the complex of 1,3-divinyl tetramethyl disiloxane, the platinum complex of 1,3-divinyl tetramethyl disiloxane and chloroplatinic acid, the complex of beta **JIKETON, the platinum complex of beta **JIKETON, a rhodium compound, and a palladium compound are illustrated. Sufficient quantity for the silicon atom absorbed water matter atom in an ingredient (E1) adding to the silicon atom joint alkenyl group in an ingredient (A), making an ingredient (A) construct a bridge, and making it harden and what is called a catalyst amount are used for an ingredient (E2). Specifically, 1 - 1,000 weight ppm of an ingredient (A) is preferred at platinum system metal conversion.
[0021]
(C) The water containing smectite clay makes the viscosity of an emulsion constituent increase while becoming a solute which emulsifies an ingredient (A).
According to the viscosity range, the appearance viscosity with a preferred ingredient (C) to BISUKO circuit tester VT-04 type (made by RION CO. LTD.) The No. 1 rotor, When attach the No. 2 rotor or the No. 3 rotor, put about 350 ml (the No. 3 rotor is about 170 ml) of samples into a cylindrical cup, it is made to rotate at the number of rotations of 62.5 rpm at 25 ** and it measures, it is 40 - 30,000 mPa-s, and is 1,000 - 10,000 mPa-s preferably.
[0022]
If the water in an ingredient (C) is pure, it will be good and the kind will not be restricted. For example, tap water, well water, ion exchange water, and distilled water are raised. Although the loadings of an ingredient (C) are 80 per ingredient (A) 100 weight section - 250 weight section, they are 100 - 230 weight section preferably. The smectite clay in an ingredient (C) is ****(ed) if water is distributed, and it increases the viscosity of water, and there is an operation which forms an emulsion with loadings of the (D) emulsifier stable at least. 0.5 to 3weight % of the water of the smectite clay in an ingredient (C) is preferred, and its 0.8 to 2 weight % is more preferred. It is because the emulsion of hypoviscosity is difficult to get when there is a thing difficult to get about an emulsion small the viscosity of an ingredient (C) and stable when there is less the quantity than 0.5 weight %, and exceeding 3 weight %.
[0023]
The smectite clay in an ingredient (C) Bentonite, montmorillonite, It is a synthetic silicate which has clay of the nature which uses argillite, such as hectorite, saponite, a sauconite, beidellite, nontronite, and a SUCHIBUN site, and those argillite as the main ingredients, and a similar lamellar crystal structure. What carried out compound refining by the refined material of a natural product and a natural product, a compound, and anionic system polymer names smectite group clay generically. All are usable, if it expands dispersedly underwater and has thickening property.
The origin of bentonite is volcanic ash about in 16 million, volcanic ash deposits it during long years, receives high pressure force, and is exploited from the bentonite stratum formed in response to heat histories, such as heat of the earth and hydrothermal. The main ingredients of bentonite are montmorillonite and montmorillonite is manufactured by refining bentonite. It distributes even to a nano level underwater and various functions are exhibited.

[0024]
Montmorillonite is generated by refining from bentonite. Montmorillonite is having the laminated structure in which the plate crystal of hydrophilic nature was piled up like "piled-up cards", and and the surface of the plate crystal, In order to have an electric charge of minus and to compensate the electric charge of the minus, the ion of the plus called an exchangeable cation exists between plate crystals (between layers). Water hydrates montmorillonite to the exchangeable cation which exists between the layer by contact with water, and it shows "swelling" which is the cubical expansion between layers or on the appearance by spreading. Thus, a laminated structure exfoliates scatteringly by ** which **** etc. do not carry, and the montmorillonite which swelled underwater is distributed. The dispersed plate crystal has the surface area (specific surface area) as 780-m^2 per g. Since the crystal surface which has an electric charge of minus, and the crystal end face charged in plus combine with each other and reveals the structural viscosity by formation of the network structure of card house structure, it is useful as a thickening agent in a drainage system. Among smectite clay, montmorillonite is preferred and Bengel W-100U made from incorporated company hoe JUN (anionic system polymer compound refining bentonite and Bengel are the registered trademarks of this company) and Bengel FW (natural bentonite refined material) are illustrated with a commercial item. High saponite [being water swellable] is preferred, and the synthetic saponite which is light color is more preferred. As synthetic saponite which is light color, smecton SA (the Kunimine Industries, Inc. make and smecton are the registered trademarks of this company) which is a hydrothermal synthesis article is illustrated with a commercial item.
[0025]
(D) Ten or more nonionic surface active agents are blended, in order that an HLB value may make the water in an ingredient (C) emulsify the liquid silicone rubber base which consists of an ingredient (A) and an ingredient (B) and may form a stable aquosity emulsion. If the water in an ingredient (C) is made to emulsify the liquid silicone rubber base which consists of an ingredient (A) and an ingredient (B), an O/W type emulsion will be formed and a W/O type emulsion will be formed depending on the case. An HLB value as ten or more nonionic surface active agents, For example, polyoxyethylene (it outlines the following POE) lauryl ether , POE oleylether, POE stearyl ether, and POE behenyl ether , POE-2-octyldodecyl ether etc. -- POE alkyl ether ;P OE glycerol monostearate. POE glycerine fatty acid esters, such as POE glycerin monoisostearate and POE glycerin bird isostearate, ;P OE sorbitan monolaurate, POE sorbitan monostearate, POE sorbitan monooleate, POE sorbitan fatty acid ester species, such as POE sorbitan tetra oleate ;P OE sorbitol mono- laurate, POE sorbitol monooleate, POE sorbitol penta oleate, POE sorbitol fatty acid ester, such as POE sorbitol monostearate, ;P OE monooleate, POE fatty acid ester, such as POE monostearate, POE distearate, POE dioleate, and ethylene glycol distearate, ;P OE octylphenyl ether , POE nonylphenyl ether , POE dinonylphenyl ether etc. -- POE alkylphenyl ether ;P OE castor oil. POE hydrogenated castor oil, POE hydrogenated-castor-oil monoisostearate, POE hydrogenated-castor-oil bird isostearate, POE hydrogenated-castor-oil mono[mono] pyroglutamate isostearic acid diester, POE castor oil hydrogenated-castor-oil derivatives, such as POE hydrogenated-castor-oil maleic acid ;P POE yellow-bees-wax lanolin derivatives, such as OE sorbitol yellow bees wax ;P OE propylene glycol fatty acid ester, It is POE fatty acid amide, a POE nonylphenyl formaldehyde condensate, etc., and ten or more things are mentioned for an HLB value. Among the above, polyoxyethylene alkyl ether is preferred in respect of emulsification power. Although the upper limit of the HLB value of an ingredient (D) is 20, 16 or less are preferred in respect of emulsification power.
This surface-active agent may use two or more sorts together. The HLB value (when using two or more sorts together, it is the weighted mean HLB value) of two or more sorts of surface-active agents is ten or more.
[0026]
The ingredient (D) can perform large loss in quantity by the thickening action of an ingredient (C),

and is 2 - 8 weight section preferably one to 9 weight section per ingredient (A) 100 weight section. It is because the film strength of the silicone rubber hardened and obtained will fall if it will be hard to become a stable emulsion if less than one weight section, and eight weight sections are exceeded.

[0027]

(F) Liquefied both-ends silanol group blockade diorganopolysiloxane has the operation which lowers the mobility of the liquid silicone rubber base which consists of an ingredient (A) and an ingredient (B). The loadings of an ingredient (F) are 2 - 10 weight section preferably, although it is 0 per ingredient (A) 100 weight section - 15 weight section. It comes out. As an organic group combined with the silicon atom in the diorganopolysiloxane which has a silanol group in both ends, Methyl group; although alkyl halide groups, such as aryl group;3, such as alkenyl-group; phenyl group [, such as alkyl-group; vinyl groups such as an ethyl group, a propyl group, and a hexyl group, and an allyl group] and tolyl group, 3, and 3-triphloropropyl group and 3-chloropropyl group, are illustrated, The point of the ease of manufacture to a methyl group is preferred. The molecular structure for Motoshige may be any of straight chain shape and straight chain shape including branching. The molecular weight for Motoshige will not be limited by the amount of (D) Motoshige especially if emulsification is possible. The amount of Motoshige is liquefied in ordinary temperature, it is preferred that the viscosity at 25 ** is 10 - 5,000 mPa-s, and it is more preferred that it is 10 - 1,000 mPa-s.

[0028]

As such diorganopolysiloxane, The dimethylpolysiloxane by which liquefied chain both ends were blocked with hydroxyl at ordinary temperature, A dimethylsiloxane methylphenyl siloxane copolymer, a methylvinyl polysiloxane, a dimethylsiloxane methylvinyl siloxane copolymer, and a methyl(3,3,3-trifluoropropyl) polysiloxane are illustrated. An ingredient (F) may be mixed when preparing a liquid silicone rubber base from an ingredient (A) and an ingredient (B). After blending with the liquid silicone rubber base which consists of an ingredient (A) and an ingredient (B), it may be made to blend other ingredients.

[0029]

The addition reaction of the mixture of an ingredient (A), an ingredient (E1), and an ingredient (E2) tends to be carried out also at ordinary temperature, and in order to prevent crosslinking reaction from advancing during emulsification and preservation of an emulsified matter, it is preferred to blend (G) addition reaction depressant further. Acetylene alcohol, an eneyne compound, benzotriazol, and tetramethyl tetravinyl cyclotetrasiloxane are illustrated as an addition reaction depressant. An addition reaction depressant inhibits the addition reaction in the ordinary temperature of an ingredient (A) and an ingredient (E1), and is good under heating to make the quantity which does not check an addition reaction contain. The desirable loadings of an addition reaction depressant are usual [0.01] - five weight sections per total quantity 100 weight section of an ingredient (A) and an ingredient (E1). In addition, unless the manifestation of the effect of this invention is checked, particle bulking agents other than a reinforcement nature silica filler, a water soluble polymer, a heat-resistant agent, an adhesive grant agent (for example, silane coupling agent), an antimicrobial agent, an antifungal agent, a color, paints, an antiperspirant, a moisturizer, etc. may be blended.

[0030]

Covering and the silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material of this invention,

For example, an ingredient (F) and an ingredient (G) are mixed first [the liquid silicone rubber base the ingredient (E1), and if needed] which consist of an ingredient (A) and an ingredient (B), Subsequently, it can manufacture by adding an ingredient (C) and an ingredient (D), mixing, carrying out agitation mixing, adding an ingredient (E2) or the emulsion-ized ingredient (E2) to the generated emulsion, and subsequently, mixing in an emulsion machine. Or [the liquid silicone rubber base, the

ingredient (E1), and if needed] which consist of an ingredient (A) and an ingredient (B) beforehand, add an ingredient (F) and an ingredient (G) and it mixes, Subsequently, after adding an ingredient (C) and an ingredient (D), mixing, carrying out stirring mixing in an emulsion machine subsequently and manufacturing an emulsion, The liquid silicone rubber base and ingredient (E2) which consist of an ingredient (A) and an ingredient (B) may be added independently, and it may mix, and subsequently an ingredient (C) and an ingredient (D) may be added, and it may mix, it may mix with the emulsion which subsequently carried out stirring mixing in the emulsion machine, manufactured the emulsion, and was manufactured beforehand, and may manufacture. The above, the liquid silicone rubber base which consists of an ingredient (A) and an ingredient (B), The silicone rubber plasticity emulsion constituent produced by mixing an ingredient (C), an ingredient (D), and an ingredient (E); The liquid silicone rubber base which consists of an ingredient (A) and an ingredient (B), The silicone rubber plasticity emulsion constituent produced by mixing an ingredient (C), an ingredient (D), an ingredient (E), and an ingredient (F); the viscosity range of the silicone rubber plasticity emulsion constituent produced by mixing an ingredient (G) other than these ingredients further, According to the viscosity range, to BISUKO circuit tester VT-04 type (made by RION CO. LTD.), the No. 1 rotor, When attach the No. 2 rotor or the No. 3 rotor, put about 350 ml (the No. 3 rotor is about 170 ml) of samples into a cylindrical cup, it is made to rotate at the number of rotations of 62.5 rpm and it measures, at 25 **, it is 50 - 3,000 mPa-s, and is 100 - 2,000 mPa-s preferably.
It is because the coating weight to a fiber base material has little viscosity at 25 **, the mobility of an emulsion constituent will be low, it will be hard to permeate the inside of a fiber base material, the coating weight on the surface of a fiber base material will moreover increase too much and proper covering will become difficult in less than 50 mPa-s, if 3,000 mPa-s is exceeded.
[0031]
The fiber base material which is the target of covering and impregnation treatment with a silicone rubber plasticity emulsion constituent, The textiles which consist of throwing which consists of many monofilaments, throwing of a staple, and this throwing, knitting which consists of this throwing, the braid which consists of this throwing, a nonwoven fabric, artificial leather made from fiber, etc. are the aggregates of much fiber. A fiber base material by covering and hardening the aggregate surface of much fiber with a silicone rubber plasticity emulsion constituent, By making a silicone rubber plasticity emulsion constituent permeate many fiber gaps, and hardening, a silicon rubber layer is formed, physical intensity, water repellence, etc. improve, and the kind of fiber for it, its form, the characteristic, etc. should not just be limited. As a kind of fiber, vegetable fiber, such as a natural fiber, for example, cotton, wool, hemp, and flax, Animal fiber; inorganic fibers, such as synthetic fibers, such as semi-synthetic fiber; polyester, such as rayon and acetate, polyamide (nylon), poly AKURIRURO nitril, polypropylene, poval, and aramid, mixed fiber of a natural fiber and a synthetic fiber, a metal fiber, glass fiber, and carbon fiber, are illustrated. As form of a fiber base material, thread, cloth, a string, a tape, a belt, and dress are illustrated.
[0032]
Covering and the manufacturing method of a fiber base material by which impregnation treatment was carried out cover and impregnate a silicone rubber plasticity emulsion constituent, removes moisture to a fiber base material, and makes it harden this constituent with silicone rubber of this invention. In order to cover the fiber base material surface with a silicone rubber plasticity emulsion constituent and to make this constituent permeate a fiber gap, the dip-coating method is preferred. In the case of the batch type, the silicone rubber plasticity emulsion constituent is put into the container, for example, A fiber base material is immersed in this silicone rubber plasticity emulsion constituent, It pulls up after fixed time and an excessive silicone rubber plasticity emulsion constituent is pressed out through between two nip rolls, the fiber base material covered and impregnated with this silicone rubber plasticity emulsion constituent is put in hot wind circle method oven, dry removal of the moisture is carried out, and this constituent is stiffened simultaneously. Or with this silicone rubber plasticity emulsion constituent, put covering and the fiber base material by

which impregnation treatment was carried out in the hot wind circulation type dryer of the temperature which is a grade which this constituent does not harden, carry out dry removal, and moisture subsequently, It puts in the hot wind circle method oven of the temperature which is a grade which this constituent hardens, and this constituent is stiffened.

[0033]

In the case of continuous system, a fiber base material between two guide rolls, for example Through, It immerses and pulls up with constant speed to a silicone rubber plasticity emulsion constituent, An excessive silicone rubber plasticity emulsion constituent is pressed out through the fiber base material pulled up between two nip rolls, Dry removal of the moisture is carried out [with this silicone rubber plasticity emulsion constituent] through covering and the fiber base material by which impregnation treatment was carried out with constant speed into a hot wind circulation type dryer or a far infrared dryer, and this constituent is stiffened simultaneously. Or with this silicone rubber plasticity emulsion constituent, let covering and the fiber base material by which impregnation treatment was carried out pass with constant speed in the hot wind circulation type dryer and far infrared dryer of the temperature which is a grade which this constituent does not harden, carry out dry removal, and moisture subsequently, In the hot wind circulation type dryer and far infrared dryer of sufficient temperature for this constituent to harden, it lets it pass with constant speed, and this constituent is stiffened.

[0034]

Or a fiber base material is coated with a silicone rubber plasticity emulsion constituent, It can manufacture also by putting in a hot wind circulation type dryer or a far infrared dryer, carrying out dry removal of the moisture, after neglecting it, making a silicone rubber plasticity emulsion constituent permeate all over a fiber gap and permeating to a rear face, and stiffening this constituent simultaneously. As a coating method for that, a spray (spraying), knife coating, brush printing, and roll coating are illustrated.

[0035]

As for the silicone rubber plasticity emulsion constituent used for the above-mentioned dip-coating method etc., it is preferred to contain the addition reaction depressant of kind sufficient at ordinary temperature to harden [do not harden, but] if it heats more than constant temperature, and quantity.

[0036]

In the above-mentioned dip-coating method, dry removal of the moisture in a silicone rubber plasticity emulsion constituent is performed at the temperature which is a grade which this constituent does not harden more highly than ordinary temperature, and the temperature which this constituent hardens, and the temperature which does not damage a fiber base material performs hardening of this constituent. When the fiber base material is made of a polyethylene terephthalate fiber, it is preferred that it is a line at 90-130 ** about dry removal of moisture and hardening of this constituent.

[0037]

If hardening is completed, fiber of a large number which constitute a fiber base material was covered with the silicone rubber coat, and fiber has banded together with silicone rubber. Since this fiber and silicone rubber have pasted up well, even if it carries out repetition bending, cover printing, friction, etc., a silicone rubber coat does not separate easily and a cut end especially with an edged tool cannot be easily frayed between this fiber. Therefore, the silicone rubber plasticity emulsion constituent of this invention can also be called fray inhibitor of the fiber base material which consists of much fiber.

[Working example]

[0038]

Hereafter, an working example and a comparative example are given and this invention is explained concretely. It means weight % among an working example that there is that it is with a part with %

about a weight section, respectively, and viscosity shows the measured value in 25 **. The emulsified state of the emulsion constituent for silicone rubber, viscosity, and each fluid characteristic were measured on condition of the following.
Emulsified state: The appearance of the emulsion constituent for silicone rubber was viewed, and the emulsified state was judged.
Mobility: The emulsion constituent for silicone rubber was sucked up by the syringe (diameter of a delivery of 3 mm), about 1 cc of it was calmly breathed out on monotonous [made from a stainless steel], the diameter of the emulsion which spread 30 seconds afterward was measured, and it classified into smallness into size.
Size; not less than about 30 mm
Inside; about 15 mm - 30 mm
Smallness; about 15 mm or less (with no mobility)
Viscosity: The No. No. 1 rotor, the No. 2 rotor, or the No. 3 rotor was attached and measured to BISUKO circuit tester VT-04 type (made by RION CO. LTD.). Put about 350 ml (the No. 3 rotor is about 170 ml) of samples into a cylindrical cup at 25 **, the No. 1 rotor, the No. 2 rotor, or the No. 3 rotor was immersed, and it was made to rotate at number of rotations of 62.5 rpm, and measured. The ingredient E2 was little very much, and since viscosity was not influenced even if it added, viscosity was measured before carrying out addition mixing of the ingredient E2.
[0039]
The ingredient used by working example and a comparative example is as follows.
AB-1: Chain both-ends dimethylvinyl siloxy group blockade dimethylpolysiloxane (0.14% of vinyl group content) A liquid liquid silicone rubber base which mixed uniformly 24 copies of hydrophobic fumed silica of specific surface area ^{2}[of 200 m]/g by which the surface treatment was carried out to 100 copies of viscosity 10,000 mPa-s by hexamethyldisilazane, and was prepared by performing heat treatment for 2 hours at 180 **;
AB-2: Chain both-ends dimethylvinyl siloxy group blockade dimethylpolysiloxane (0.14% of vinyl group content) A liquid liquid silicone rubber base which mixed uniformly 17 copies of hydrophobic fumed silica of specific surface area ^{2}[of 200 m]/g by which the surface treatment was carried out by 100 copies and hexamethyldisilazane of viscosity 10,000 mPa-s, and was prepared by performing heat treatment for 2 hours at 180 **;
F: Chain both-ends silanol group blockade dimethylpolysiloxane (viscosity 40 mPa-s);
E1: A both-ends trimethylsiloxy group blockade dimethylsiloxane methylhydrogensiloxane copolymer (0.8% of silicon atom absorbed water matter content, viscosity 5 mPa-s);
E2: A complex of chloroplatinic acid and 1,3-divinyl tetramethyl disiloxane (0.6 weight % of platinum content);
G: A 3,5-dimethyl- hexyn-3-oar (addition reaction depressant);
C-1: A water dispersion of smecton SA by Kunimine Industries, Inc. (synthetic saponite, thin film integrated circuit particles, mean particle diameter of about 20 micrometers, BET method specific surface area160m^2/g, and smecton are the registered trademarks of this company) (1% of content of smecton SA)
C-2: A water dispersion of smecton SA by Kunimine Industries, Inc. (synthetic saponite, thin film integrated circuit particles, mean particle diameter of about 20 micrometers, BET method specific surface area160m^2/g) (3% of content of smecton SA)
C-3: A water dispersion of Bengel W-100U made from incorporated company hoe JUN (anionic system polymer compound refining bentonite and Bengel are the registered trademarks of this company) (1% of content of Bengel W-100U)
C-4: A water dispersion of Bengel FW (natural bentonite refined material) made from incorporated company hoe JUN (5% of Bengel's FW content)
D-1: Mitsuhiro -- transformation -- incorporated company Selected Special Wax SS-50 (it is

polyoxyethylene alkyl ether and HLB value 10.5 and Selected Special Wax are the registered trademarks of this company)
D-2: Mitsuhiro -- transformation -- incorporated company Selected Special Wax SS-70 (being polyoxyethylene alkyl ether HLB value 12.8)
D-3: Tergitol TMN-6 of the Dow Chemical Japan, Inc. sale (it is 2,6,8-trimethyl 4-nonyloxy polyethyleneoxy ethanol, and HLB value 13.1 and Tergitol are registered trademarks)
[0040]
The dip-coating conditions in an working example and a comparative example are as follows.
A fiber base material: 10 mm in width, a 0.4-mm-thick planishing string with a ball which are the braids made from throwing (14 [/(cm)]) of two multifilament whose single fibers made from polyethylene terephthalate are 150 deniers.
Dip coating, and desiccation and curing conditions: The above-mentioned planishing string was continuously immersed by 5 seconds of holding time into a silicone rubber plasticity emulsion constituent put into a container. A planishing string with which it was covered and impregnated is continuously taken out with a silicone rubber plasticity emulsion constituent, Between nip rolls (20 mm in thickness of a rubber layer, 80 hardness, a roll diameter of 150 mm, nip width of 10 mm, peripheral-speed 1.7 m/min of a nip roll) was passed continuously, and an excessive silicone rubber plasticity emulsion constituent was pressed out. Subsequently, inside of a 100 ** hot wind circulation type dryer is applied for 15 minutes, was passed, and hardening of water removal and a constituent was performed.
[0041]
Covering and a planishing string which did impregnation treatment evaluated by a following method with silicone rubber.
Adhesion of a silicone-rubber coat: A silicone rubber coat formed on a planishing string was drawn through strongly, exfoliation of a silicone rubber coat and omission were observed, and the following three-stage estimated.
O; with no omission of a silicone rubber coat.
**; a silicone rubber coat falls out slightly.
x; a silicone rubber coat falls out.
Fray nature: Silicone rubber cut with scissors covering and a planishing string which did impregnation treatment in a transverse direction, a fray when a cutting plane was drawn through by a fingertip was observed, and the following three-stage estimated. A fray generated easily a cutting plane of covering and a parallel string before carrying out impregnation treatment in cover printing of a fingertip with silicone rubber.
O; with [it is frayed by power in which a fingertip is strong, and] no generating.
**; it frays and generates by power in which a fingertip is strong.
x; it frays and generates in weak power or poor ability of a fingertip.
[0042]
[An working example 1]
In a mixer, to 100 copies of AB-1 1.3 copies of E1, 2.0 copies of F, After adding 0.04 copy of G and mixing, add 200 copies of C-3, 1.5 copies of D-1, and 2.0 copies of D-2, mix, and T.K. homomixer MARKII2.5 type (homomixer by special opportunity-ized industrial incorporated company) is used, Stirring mixing was carried out for 5 minutes at 7,000 rpm, and a silicone rubber plasticity emulsion was prepared. Next, after degassing this silicone rubber plasticity emulsion constituent with a vacuum pump, fluid observation and measurement of viscosity were carried out. The result was shown in Table 1. 0.05 pair per [E2] 100 copies of AB-1 was added after measurement of viscosity, and dip coating was carried out to a parallel string after mixing. Adhesion and fray nature of covering and a planishing string which did impregnation treatment were evaluated with silicone rubber. The result was shown in Table 1. A planishing string's pliability was the same as that of processing before almost. It turned out that a silicone rubber plasticity emulsion constituent by this invention is

excellent in dip-coating nature, covering and a planishing string which did impregnation treatment have the good adhesion of a silicone rubber coat, and fray-proof nature is also excellent at silicone rubber.

[0043]

[Comparative example 1]

In a mixer, to 100 copies of AB-1 1.3 copies of E1, 2.0 copies of F, After adding 0.04 copy of G and mixing, 200 copies of C-3, 5.0 copies of D-1, and 5.5 copies of D-2 were added, it mixed, mixed stirring was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after observing and measuring mobility and viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1.

[0044]

[Working example 2]

After adding 3.0 copies of F, 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 200 copies of C-2, 3.5 copies of D-1, and 4.0 copies of D-2 were added, it mixed, stirring mixing was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1. The planishing string's pliability was the same as that of processing before almost.

[0045]

[Comparative example 2]

After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 200 copies of C-2, 5.0 copies of D-1, and 5.5 copies of D-2 were added, it mixed, stirring mixing was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1.

[0046]

[Working example 3]

After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 150 copies of C-4, 3.0 copies of D-1, and 3.0 copies of D-2 were added, it mixed, agitation mixing was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1. The planishing string's pliability was the same as that of processing before almost.

[0047]

[An working example 4]

After adding 3.0 copies of F, 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-2 and mixing in a container, 200 copies of C-3, 1.5 copies of D-1, and 2.0 copies of D-2 were added, it mixed, stirring mixing was carried out like an working example 1 using a homomixer, and a silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with a vacuum pump, after carrying out fluid observation and

measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-2 was added, dip coating was carried out by the same method as an working example 1 after mixing, and that evaluation result was shown in Table 1. A planishing string's pliability was the same as that of processing before almost.

[0048]

[An working example 5]

After adding 1.0 copy of F, 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-2 and mixing in a container, 200 copies of C-3 and 3.0 copies of D-3 were added, it mixed, stirring mixing was carried out like an working example 1 using a homomixer, and a silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with a vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.1 pair per [E2] 100 copies of AB-2 was added, dip coating was carried out by the same method as an working example 1 after mixing, and that evaluation result was shown in Table 1. A planishing string's pliability was the same as that of processing before almost.

[0049]

[Working example 6]

After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a mixer, add 200 copies of C-3, 1.5 copies of D-1, and 2.0 copies of D-2, mix, and mixed stirring is carried out like the working example 1 using a homomixer, The silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after observing and measuring mobility and viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1. The planishing string's pliability was the same as that of processing before almost.

[0050]

[Comparative example 3]

After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 150 copies of C-2, 5.0 copies of D-1, and 5.5 copies of D-2 were added, it mixed, stirring mixing was carried out at the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, degassed this silicone rubber plasticity emulsion constituent with the vacuum pump, after carrying out fluid observation and measurement of viscosity, added 0.05 pair per [E2] 100 copies of AB-1, carried out dip coating by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1, but. Mobility was bad because of the hyperviscous emulsion, the dripping piece nature from a nip roll was bad, and prolonged processing was difficult.

[0051]

[The comparative example 4]

After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 100 copies of C-1, 5.0 copies of D-1, and 5.5 copies of D-2 were added, it mixed, agitation mixing was carried out like an working example 1 using a homomixer, and a silicone rubber plasticity emulsion was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with a vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as an working example 1 after mixing, and that evaluation result was shown in Table 1.

[0052]

[Table 1]

表 1

	実施例 1	実施例 2	実施例 3	実施例 4	実施例 5	実施例 6	比較例 1	比較例 2	比較例 3	比較例 4
粘度（mPa・s）	750	1900	1000	550	550	700	650	1300	4000	450
流動性	大	中	中	大	大	大	大	中	小	大
密着性	◎	◎	◎	◎	◎	◎	△	×	◎	×
ほつれ性	◎	◎	◎	◎	◎	◎	△	△	◎	×

[Industrial applicability]
[0053]
Especially a silicone rubber plasticity emulsion constituent for dip coating of this invention is useful as a fray inhibitor as covering and an impregnation treatment agent of fiber base materials, such as textiles, knitting, a braid, and a nonwoven fabric.
Covering and a manufacturing method of a fiber base material by which impregnation treatment was carried out are useful at silicone rubber of this invention, although covering and a fiber base material by which impregnation treatment was carried out are continuously manufactured efficiently with silicone rubber.
In especially the sewing industry, since the fiber base material which aesthetic property was good, was excellent in pliability, and was moreover excellent in opposite fray nature brings about the remarkable improvement in the productivity of sewing work, covering and the fiber base material by which impregnation treatment was carried out are very useful to sewing work at silicone rubber by the manufacturing method of this invention.
[Brief Description of the Drawings]
[0054]
[Drawing 1]Drawing 1 is a mimetic diagram of the dip-coating work in an working example and a comparative example.
[Drawing 2]Drawing 2 is a photograph after covering and the fray examination of a planishing string by which impregnation treatment was carried out in silicone rubber of the working example 1.
[Drawing 3]Drawing 3 is a photograph after covering and the fray examination of a planishing string by which impregnation treatment was carried out in silicone rubber of the comparative example 1.
[Drawing 4]Drawing 4 is a photograph after covering and a fray examination of the planishing string which has not done impregnation treatment in silicone rubber.
[Explanations of letters or numerals]
[0055]
1 Planishing string
2 Guide roll
3 Nip roll
4 Silicone rubber plasticity emulsion constituent
5 Hot wind circulation type dryer

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention]
[0001]
This invention relates addition reaction hardening type the silicone rubber plasticity emulsion constituent and fiber base material for covering and impregnation treatment of a fiber base material to covering and the manufacturing method of a fiber base material by which impregnation treatment was carried out with covering and silicone rubber by carrying out impregnation treatment with this silicone rubber plasticity emulsion constituent.

[Translation done.]

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PRIOR ART

[Background of the Invention]
[0002]
The method of manufacturing silicone rubber covering textiles is more publicly known in ancient times by coating textiles with the silicone rubber coating agent which consists of diorganopolysiloxane crude rubber, a reinforcement nature silica filler, organic peroxide, an organic solvent, etc., heating it, and stiffening it. However, the organic solvent is harmful to a human body, and since there is danger of a fire, the coating agent which consists of a silicone aqueous emulsion is proposed. For example, it has at least two silicon atom joint alkenyl groups in the (A) monad, The viscosity at 25 ** Organopolysiloxane of 300 or more centistokes, (B) The ORGANO hydrogen polysiloxane which contains in a monad three or more hydrogen atoms combined with the silicon atom, (C) The air bag coated with the coating composition for air bags and silicone rubber which consist of a silicone aqueous emulsion prepared by emulsion-izing a compound including a curing catalyst in the bottom of existence of an emulsifier and water is indicated by JP,5-202338,A, alpha, omega-divinyl-ized polyorganosiloxane oil, the polyorganosiloxane oil containing **SiH, The method of covering with a silicone elastomer is indicated in the ** table 2005-530053 by coating a structural textile with the emulsion which emulsified in water the polyaddition catalyst etc. which consist of an adhesion accelerator and a platinum metal, heating it, and stiffening it.
[0003]
The aquosity polyorganosiloxane emulsion which can construct a bridge over an elastomer by the polyaddition reaction for making weaving or the nature base material of non-woven textile impregnate, Namely, alpha, omega-divinyl-ized polyorganosiloxane oil, polyorganosiloxane oil containing **SiH, The method of using it for the emulsion which emulsified in water the polyaddition catalyst etc. which consist of an adhesion accelerator and a platinum metal, and fiber base material covering of this emulsion is indicated in the ** table 2005-530052. However, there is a problem that the above-mentioned coating has insufficient fray-proof nature, and there are a silicone elastomer and a feeling of adhesion peculiar to silicone rubber.
[0004]
On the other hand, the method of manufacturing a silicone elastomer from an aquosity silicone emulsion and the aquosity silicone emulsion for it are indicated by JP,2004-346248,A, and International-Publication WO2004/104105. In them, vinyl group content diorganopolysiloxane, the ORGANO hydrogen polysiloxane, The emulsion constituent for silicone rubber which consists of a platinum system catalyst, water containing smectite clay, an emulsifier, etc., The manufacturing method and this emulsion constituent for silicone rubber are heated and stiffened, and the method of forming low-specific-gravity silicone rubber and sponge-like (porosity) silicone rubber is taught by subsequently drying.
It is indicated that the silicone rubber obtained in this way is useful to the object for mold goods, the object for coating, and printing.

[0005]
the emulsion constituent for these silicone rubber, this invention persons, -- various fiber base materials (for example, textiles.) Apply to knitting, a braid, and a nonwoven fabric with a spray, a knife coat, brush printing, or a roll coat, when dry removal of the moisture is carried out with heating and it is made to harden, can make a silicone rubber coat form on a fiber base material, but. He has noticed that the emulsion constituent for silicone rubber hardly permeates in a fiber base material for a ********** reason, but remains in surface coating.
[0006]
Then, although the dip-coating method was tried, this emulsion constituent for silicone rubber is thixotropic, its perviousness into a fiber base material is low because of hyperviscosity, and, moreover, a lot of emulsions adhere to a fiber base material after immersion. Therefore, if a silicone rubber coat cannot fully stick to a fiber base material, and cannot fully band together with silicone rubber in fiber but carries out repetition friction, cover printing, bending, etc., A cut end with an edged tool is frayed [that a silicone rubber coat separates easily and between fiber is frayed easily, especially] easily, In the diaphragm by the nip roll which is the post process, he could not reduce substantially the amount of superintendent officers to the fiber base material, but has noticed that there is a problem of spoiling the original aesthetic property and pliability of a fiber base material. This emulsion constituent for silicone rubber is thixotropic, and he has noticed that there is a problem that the dripping piece nature from a nip roll is bad, and cannot carry out dip coating of the fiber base material continuously for a long time for hyperviscosity.
[0007]
[Patent documents 1] JP,H5-202338,A
[Patent documents 2] JP,2005-530053,A
[Patent documents 3] JP,2005-530052,A
[Patent documents 4] JP,2004-346248,A
[Patent documents 5] International-Publication WO2004/104105

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention]
[0011]
Covering and the silicone rubber plasticity emulsion constituent for impregnation treatment of the fiber base material of this invention, Viscosity is low, mobility is high and impregnation treatment is efficiently possible continuously to the inside of fiber base materials, such as textiles, knitting, a braid, and a nonwoven fabric, And the silicone rubber coat formed by carrying out dry removal and stiffening moisture is well stuck for fiber, and it excels in the unity between fiber, even if it carries out repetition friction, cover printing, bending, etc., a silicone rubber coat does not separate easily, between fiber cannot be frayed easily, and a cut end especially with an edged tool cannot be frayed easily. Covering and the fiber base material by which impregnation treatment was carried out are flexible at this silicone rubber.
Even if according to the manufacturing method of this invention it is covered with a silicone rubber coat, between fiber bands together firmly with silicone rubber and a fiber surface carries out repetition friction, cover printing, bending, etc., Covering and the fiber base material by which impregnation treatment was carried out can be continuously manufactured efficiently with silicone rubber [say / that a silicone rubber coat does not separate easily, between fiber cannot be frayed easily, and a cut end especially with an edged tool cannot be frayed easily].

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem to be solved by the invention]
[0008]
The purpose of this invention is the above-mentioned problem to cancel, and specifically, Viscosity is low, mobility is high and impregnation treatment is efficiently possible continuously to the inside of fiber base materials, such as textiles, knitting, a braid, and a nonwoven fabric, And the silicone rubber coat formed by carrying out dry removal and stiffening moisture is well stuck for fiber, It excels in the unity between fiber, and is hard to be frayed, and a cut end especially with an edged tool cannot be frayed easily, The silicone rubber plasticity emulsion constituent that the obtained fiber base material is flexible, And a fiber surface is covered with a silicone rubber coat, and between fiber bands together firmly with silicone rubber, It is in providing the method of manufacturing the fiber base material in which a silicone rubber coat does not separate easily even if it carries out repetition friction, cover printing, bending, etc., between fiber cannot be frayed easily, and a cut end especially with an edged tool cannot be frayed easily.

[Translation done.]

* NOTICES *

MEANS

[Means for solving problem]
[0009]
This invention,
" [1] The liquid silicone rubber base which consists of liquefied diorganopolysiloxane 100 weight section, and (B) reinforcement nature silica filler 5 - 60 weight sections which have at least two silicon atom joint alkenyl groups in the (A) one molecule, (F) Zero to both-ends silanol group blockade diorganopolysiloxane 15 liquefied weight section, (C) The non-ion system surface-active agent 1 whose 80 to water 250 weight section containing smectite clay and (D) HLB value are ten or more - nine weight sections, And it consists of organopolysiloxane and the platinum (E2) system catalyst which have at least two silicon atom absorbed water matter atoms in one (E1) molecule of sufficient quantity for making the (E) ingredient (A) construct a bridge, Covering and the silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material characterized by viscosity being 50 - 3,000 mPa-s in 25 **.
[2] . It is characterized by viscosity (however, apparent viscosity when it measures with revolving speed of 62.5 rpm in 25 ** with a rotary type cylinder viscosity meter) of an ingredient (C) being 40 - 30,000 mPa-s. [1] Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material of a description.
[3] Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material given in [2], wherein an ingredient (C) is what carries out 0.5-3 weight-section content of the smectite clay per water 100 weight section.
[4] An alkenyl group in an ingredient (A) is a vinyl group, and a residual organic group is a methyl group, Covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material given in [1], wherein an ingredient (F) is both-ends silanol group blockade dimethylpolysiloxane and an ingredient (B) is a hydrophobing reinforcement nature silica filler.
[5] covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material given in [1], wherein non-ion system surface-active agents of an ingredient (D) are polyoxyethylene alkyl ether. " -- it is related.
An alkenyl group in [1 [4-]] "ingredient (A) is a vinyl group, A residual organic group is a methyl group and an ingredient (F) is both-ends silanol group blockade dimethylpolysiloxane, . It is characterized by an ingredient (B) being a hydrophobing reinforcement nature silica filler. [2] Or covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material given in [3], and covering and a silicone rubber plasticity emulsion constituent for impregnation treatment of a fiber base material of [2], [3], [4], or [4-1] description, wherein non-ion system surface-active agents of [5-1] ingredient (D) are polyoxyethylene alkyl ether. " -- it is related.
[0010]
This invention,

It is related with "[6] Manufacturing method of a fiber base material which was carried out with silicone rubber as for covering and impregnation treatment covering and impregnating a silicone rubber plasticity emulsion constituent given in either of [1] - [5], removing moisture to a fiber base material, and making it harden this constituent."
It is related with "[1 [6-]] Manufacturing method of a fiber base material which was carried out with silicone rubber as for covering and impregnation treatment covering and impregnating a silicone rubber plasticity emulsion constituent given in [4-1] or [5-1], removing moisture to a fiber base material, and making it harden this constituent."

[Translation done.]

* NOTICES *

EXAMPLE

[Working example]
[0038]
Hereafter, an working example and a comparative example are given and this invention is explained concretely. It means weight % among an working example that there is that it is with a part with % about a weight section, respectively, and viscosity shows the measured value in 25 **. The emulsified state of the emulsion constituent for silicone rubber, viscosity, and each fluid characteristic were measured on condition of the following.
Emulsified state: The appearance of the emulsion constituent for silicone rubber was viewed, and the emulsified state was judged.
Mobility: The emulsion constituent for silicone rubber was sucked up by the syringe (diameter of a delivery of 3 mm), about 1 cc of it was calmly breathed out on monotonous [made from a stainless steel], the diameter of the emulsion which spread 30 seconds afterward was measured, and it classified into smallness into size.
Size; not less than about 30 mm
Inside; about 15 mm - 30 mm
Smallness; about 15 mm or less (with no mobility)
Viscosity: The No. No. 1 rotor, the No. 2 rotor, or the No. 3 rotor was attached and measured to BISUKO circuit tester VT-04 type (made by RION CO. LTD.). Put about 350 ml (the No. 3 rotor is about 170 ml) of samples into a cylindrical cup at 25 **, the No. 1 rotor, the No. 2 rotor, or the No. 3 rotor was immersed, and it was made to rotate at number of rotations of 62.5 rpm, and measured. The ingredient E2 was little very much, and since viscosity was not influenced even if it added, viscosity was measured before carrying out addition mixing of the ingredient E2.
[0039]
The ingredient used by working example and a comparative example is as follows.
AB-1: Chain both-ends dimethylvinyl siloxy group blockade dimethylpolysiloxane (0.14% of vinyl group content) A liquid liquid silicone rubber base which mixed uniformly 24 copies of hydrophobic fumed silica of specific surface area ^{2}[of 200 m]/g by which the surface treatment was carried out to 100 copies of viscosity 10,000 mPa-s by hexamethyldisilazane, and was prepared by performing heat treatment for 2 hours at 180 **;
AB-2: Chain both-ends dimethylvinyl siloxy group blockade dimethylpolysiloxane (0.14% of vinyl group content) A liquid liquid silicone rubber base which mixed uniformly 17 copies of hydrophobic fumed silica of specific surface area ^{2}[of 200 m]/g by which the surface treatment was carried out by 100 copies and hexamethyldisilazane of viscosity 10,000 mPa-s, and was prepared by performing heat treatment for 2 hours at 180 **;
F: Chain both-ends silanol group blockade dimethylpolysiloxane (viscosity 40 mPa-s);
E1: Both-ends trimethylsiloxy group blockade dimethylsiloxane methylhydrogensiloxane copolymer (0.8% of silicon atom absorbed water matter content, viscosity 5 mPa-s);

E2: Complex of chloroplatinic acid and 1,3-divinyl tetramethyl disiloxane (0.6 weight % of platinum content);
G: 3,5-dimethyl- hexyn-3-oar (addition reaction depressant);
C-1: The water dispersion of smecton SA by Kunimine Industries, Inc. (synthetic saponite, thin film integrated circuit particles, the mean particle diameter of about 20 micrometers, BET method specific surface area160m^2/g, and smecton are the registered trademarks of this company) (1% of content of smecton SA)
C-2: The water dispersion of smecton SA by Kunimine Industries, Inc. (synthetic saponite, thin film integrated circuit particles, mean particle diameter of about 20 micrometers, BET method specific surface area160m^2/g) (3% of content of smecton SA)
C-3: The water dispersion of Bengel W-100U made from incorporated company hoe JUN (anionic system polymer compound refining bentonite and Bengel are the registered trademarks of this company) (1% of content of Bengel W-100U)
C-4: The water dispersion of Bengel FW (natural bentonite refined material) made from incorporated company hoe JUN (5% of Bengel's FW content)
D-1: Mitsuhiro -- transformation -- incorporated company Selected Special Wax SS-50 (it is polyoxyethylene alkyl ether and HLB value 10.5 and Selected Special Wax are the registered trademarks of this company)
D-2: Mitsuhiro -- transformation -- incorporated company Selected Special Wax SS-70 (being polyoxyethylene alkyl ether HLB value 12.8)
D-3: Tergitol TMN-6 of the Dow Chemical Japan, Inc. sale (it is 2,6,8-trimethyl 4-nonyloxy polyethyleneoxy ethanol, and HLB value 13.1 and Tergitol are registered trademarks)
[0040]
The dip-coating conditions in an working example and a comparative example are as follows.
Fiber base material: 10 mm in width, the 0.4-mm-thick planishing string with a ball which are the braids made from throwing (14 [/(cm)]) of two multifilament whose single fibers made from polyethylene terephthalate are 150 deniers.
Dip coating, and desiccation and curing conditions: The above-mentioned planishing string was continuously immersed by 5 seconds of holding time into the silicone rubber plasticity emulsion constituent put into the container. The planishing string with which it was covered and impregnated is continuously taken out with a silicone rubber plasticity emulsion constituent, Between nip rolls (20 mm in thickness of a rubber layer, 80 hardness, the roll diameter of 150 mm, nip width of 10 mm, peripheral-speed 1.7 m/min of a nip roll) was passed continuously, and the excessive silicone rubber plasticity emulsion constituent was pressed out. Subsequently, the inside of a 100 ** hot wind circulation type dryer is applied for 15 minutes, was passed, and hardening of water removal and a constituent was performed.
[0041]
Covering and the planishing string which did impregnation treatment evaluated by the following method with silicone rubber.
Adhesion of a silicone-rubber coat: The silicone rubber coat formed on the planishing string was drawn through strongly, exfoliation of a silicone rubber coat and omission were observed, and the following three-stage estimated.
O; with no omission of a silicone rubber coat.
**; a silicone rubber coat falls out slightly.
x; a silicone rubber coat falls out.
Fray nature: Silicone rubber cut with scissors covering and the planishing string which did impregnation treatment in the transverse direction, the fray when the cutting plane was drawn through by the fingertip was observed, and the following three-stage estimated. The fray generated easily the cutting plane of covering and the parallel string before carrying out impregnation

treatment in cover printing of the fingertip with silicone rubber.
O; with [it is frayed by the power in which a fingertip is strong, and] no generating.
**; it frays and generates by the power in which a fingertip is strong.
x; it frays and generates in the weak power or poor ability of a fingertip.
[0042]
[Working example 1]
In a mixer, to 100 copies of AB-1 1.3 copies of E1, 2.0 copies of F, After adding 0.04 copy of G and mixing, add 200 copies of C-3, 1.5 copies of D-1, and 2.0 copies of D-2, mix, and T.K. homomixer MARKII2.5 type (homomixer by special opportunity-ized industrial incorporated company) is used, Stirring mixing was carried out for 5 minutes at 7,000 rpm, and the silicone rubber plasticity emulsion was prepared. Next, after degassing this silicone rubber plasticity emulsion constituent with the vacuum pump, fluid observation and measurement of viscosity were carried out. The result was shown in Table 1. 0.05 pair per [E2] 100 copies of AB-1 was added after measurement of viscosity, and dip coating was carried out to the parallel string after mixing. The adhesion and fray nature of covering and the planishing string which did impregnation treatment were evaluated with silicone rubber. The result was shown in Table 1. The planishing string's pliability was the same as that of processing before almost. It turned out that the silicone rubber plasticity emulsion constituent by this invention is excellent in dip-coating nature, covering and the planishing string which did impregnation treatment have the good adhesion of a silicone rubber coat, and fray-proof nature is also excellent at silicone rubber.
[0043]
[The comparative example 1]
In a mixer, to 100 copies of AB-1 1.3 copies of E1, 2.0 copies of F, After adding 0.04 copy of G and mixing, 200 copies of C-3, 5.0 copies of D-1, and 5.5 copies of D-2 were added, it mixed, mixed stirring was carried out like an working example 1 using a homomixer, and a silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with a vacuum pump, after observing and measuring mobility and viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as an working example 1 after mixing, and that evaluation result was shown in Table 1.
[0044]
[An working example 2]
After adding 3.0 copies of F, 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 200 copies of C-2, 3.5 copies of D-1, and 4.0 copies of D-2 were added, it mixed, stirring mixing was carried out like an working example 1 using a homomixer, and a silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with a vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as an working example 1 after mixing, and that evaluation result was shown in Table 1. A planishing string's pliability was the same as that of processing before almost.
[0045]
[Comparative example 2]
After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 200 copies of C-2, 5.0 copies of D-1, and 5.5 copies of D-2 were added, it mixed, stirring mixing was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1.
[0046]

[Working example 3]
After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 150 copies of C-4, 3.0 copies of D-1, and 3.0 copies of D-2 were added, it mixed, agitation mixing was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1. The planishing string's pliability was the same as that of processing before almost.
[0047]
[Working example 4]
After adding 3.0 copies of F, 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-2 and mixing in a container, 200 copies of C-3, 1.5 copies of D-1, and 2.0 copies of D-2 were added, it mixed, stirring mixing was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-2 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1. The planishing string's pliability was the same as that of processing before almost.
[0048]
[Working example 5]
After adding 1.0 copy of F, 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-2 and mixing in a container, 200 copies of C-3 and 3.0 copies of D-3 were added, it mixed, stirring mixing was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.1 pair per [E2] 100 copies of AB-2 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1. The planishing string's pliability was the same as that of processing before almost.
[0049]
[Working example 6]
After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a mixer, add 200 copies of C-3, 1.5 copies of D-1, and 2.0 copies of D-2, mix, and mixed stirring is carried out like the working example 1 using a homomixer, The silicone rubber plasticity emulsion constituent was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after observing and measuring mobility and viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1. The planishing string's pliability was the same as that of processing before almost.
[0050]
[Comparative example 3]
After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 150 copies of C-2, 5.0 copies of D-1, and 5.5 copies of D-2 were added, it mixed, stirring mixing was carried out at the working example 1 using the homomixer, and the silicone rubber plasticity emulsion constituent was prepared. Next, degassed this silicone rubber plasticity emulsion constituent with the vacuum pump, after carrying out fluid observation and measurement of viscosity, added 0.05 pair per [E2] 100 copies of AB-1, carried out dip coating by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1, but. Mobility was bad because of the hyperviscous emulsion, the dripping piece nature from a nip roll was bad,

and prolonged processing was difficult.
[0051]
[Comparative example 4]
After adding 1.3 copies of E1, and 0.04 copy of G to 100 copies of AB-1 and mixing in a container, 100 copies of C-1, 5.0 copies of D-1, and 5.5 copies of D-2 were added, it mixed, agitation mixing was carried out like the working example 1 using the homomixer, and the silicone rubber plasticity emulsion was prepared. Next, this silicone rubber plasticity emulsion constituent was degassed with the vacuum pump, after carrying out fluid observation and measurement of viscosity, 0.05 pair per [E2] 100 copies of AB-1 was added, dip coating was carried out by the same method as the working example 1 after mixing, and that evaluation result was shown in Table 1.
[0052]
[Table 1]

表 1

	実施例 1	実施例 2	実施例 3	実施例 4	実施例 5	実施例 6	比較例 1	比較例 2	比較例 3	比較例 4
粘度（mPa・s）	750	1900	1000	550	550	700	650	1300	4000	450
流動性	大	中	中	大	大	大	大	中	小	大
密着性	◎	◎	◎	◎	◎	◎	△	×	◎	×
ほつれ性	◎	◎	◎	◎	◎	◎	△	△	◎	×

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[0054]
[Drawing 1]Drawing 1 is a mimetic diagram of the dip-coating work in an working example and a comparative example.
[Drawing 2]Drawing 2 is a photograph after covering and the fray examination of a planishing string by which impregnation treatment was carried out in silicone rubber of the working example 1.
[Drawing 3]Drawing 3 is a photograph after covering and the fray examination of a planishing string by which impregnation treatment was carried out in silicone rubber of the comparative example 1.
[Drawing 4]Drawing 4 is a photograph after covering and a fray examination of the planishing string which has not done impregnation treatment in silicone rubber.

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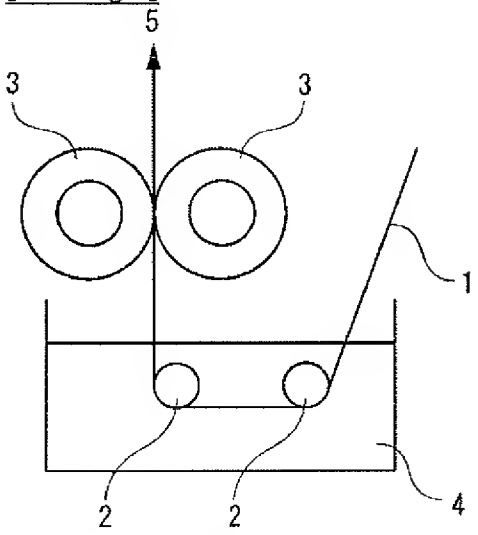
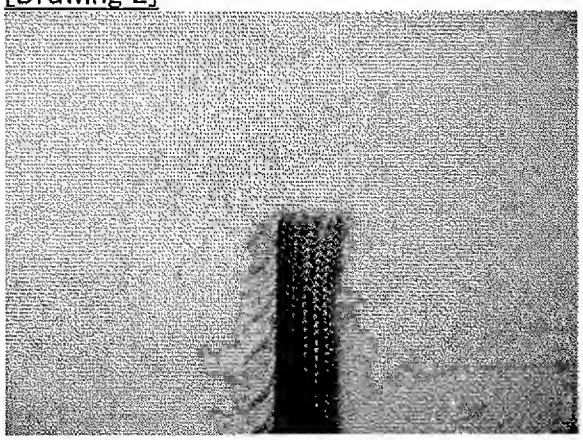
DRAWINGS

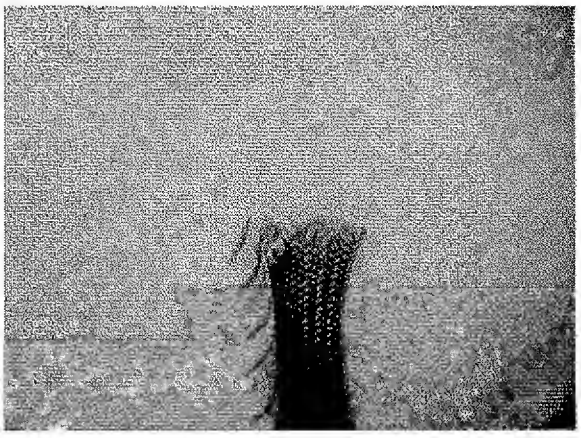
[Drawing 1]



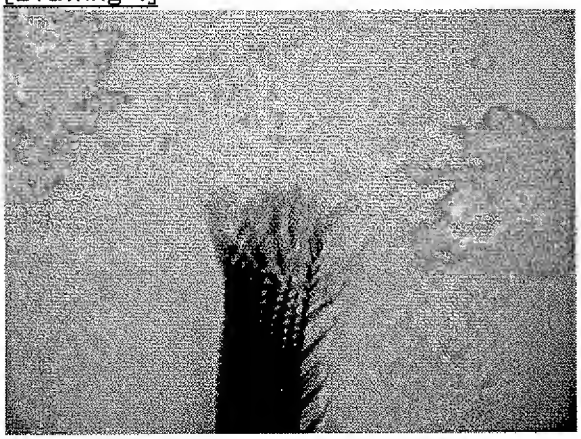
[Drawing 2]



[Drawing 3]



[Drawing 4]



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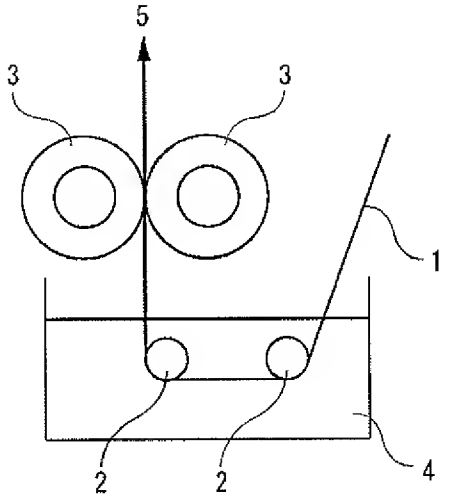
最終頁に続く

(54)【発明の名称】繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物およびシリコーンゴムで被覆・含浸処理された繊維質基材の製造方法

(57)【要約】
【課題】繊維質基材を被覆含浸処理しやすく、シリコーンゴム皮膜が繊維によく密着し、繊維間の結束性に優れた繊維質基材を与えるシリコーンゴム形成性エマルション組成物およびかかる繊維質基材を製造する方法を提供する。
【解決手段】(A) 液状アルケニル基含有ジオルガノポリシロキサンと(B)補強性シリカフィラーとからなる液状シリコーンゴムベース、(F)液状両末端シラノール基封鎖ジオルガノポリシロキサン、(C)スメクタイトクレー含有水、(D)ＨＬＢ値が１０以上の非イオン系界面活性剤および（Ｅ１）ケイ素結合水素原子含有オルガノポリシロキサンと（Ｅ２）白金系触媒からなり、粘度が50～3,000mPa・sである、繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。繊維質基材を該組成物で処理してシリコーンゴムで被覆含浸処理した繊維質基材を製造する方法。
【選択図】図１



【特許請求の範囲】
【請求項1】
（Ａ）１分子中に少なくとも２個のケイ素原子結合アルケニル基を有する液状ジオルガノポリシロキサン１００重量部と（Ｂ）補強性シリカフィラー５～６０重量部とからなる液状シリコーンゴムベース、（Ｆ）液状の両末端シラノール基封鎖ジオルガノポリシロキサン０～１５重量部、（Ｃ）スメクタイトクレーを含有する水８０～２５０重量部、（Ｄ）ＨＬＢ値が１０以上である非イオン系界面活性剤１～９重量部、および（Ｅ）成分（Ａ）を架橋させるに充分な量の（Ｅ１）１分子中に少なくとも２個のケイ素原子結合水素原子を有するオルガノポリシロキサンと（Ｅ２）白金系触媒からなり、２５℃において粘度が５０～３，０００ｍＰａ・ｓであることを特徴とする、繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
【請求項2】
成分（Ｃ）の粘度（ただし、回転型円筒粘度計により２５℃において回転速度６２.５ｒｐｍで測定したときの見かけ粘度）が４０～３０，０００ｍＰａ・ｓであることを特徴とする、請求項１記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
【請求項3】
成分（Ｃ）が水１００重量部当たりスメクタイトクレーを０.５～３重量部含有するものであることを特徴とする、請求項２記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
【請求項4】
成分（Ａ）中のアルケニル基がビニル基であり、残余の有機基がメチル基であり、成分（Ｆ）が両末端シラノール基封鎖ジメチルポリシロキサンであり、成分（Ｂ）が疎水化補強性シリカフィラーであることを特徴とする、請求項１記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
【請求項5】
成分（Ｄ）の非イオン系界面活性剤がポリオキシエチレンアルキルエーテル類であることを特徴とする、請求項１記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
【請求項6】
繊維質基材に請求項１～請求項５のいずれか1項記載のシリコーンゴム形成性エマルション組成物を被覆・含浸し、水分を除去し該組成物を硬化させることを特徴とする、シリコーンゴムで被覆・含浸処理された繊維質基材の製造方法。

【発明の詳細な説明】
【技術分野】
【0001】
本発明は、繊維質基材の被覆・含浸処理用の付加反応硬化型のシリコーンゴム形成性エマルション組成物および繊維質基材を該シリコーンゴム形成性エマルション組成物で被覆・含浸処理することによるシリコーンゴムで被覆・含浸処理された繊維質基材の製造方法に関する。
【背景技術】
【0002】
ジオルガノポリシロキサン生ゴム、補強性シリカフィラー、有機過酸化物、有機溶媒などからなるシリコーンゴムコーテイング剤を織物にコーテイングし加熱して硬化させることによりシリコーンゴム被覆織物を製造する方法は古くより公知である。しかし、有機溶媒は人体に有害であり、火災の危険があるので、シリコーン水性エマルジョンよりなるコーティング剤が提案されている。例えば、（Ａ）一分子中にケイ素原子結合アルケニル基を少なくとも２個有し、２５℃における粘度が３００センチストークス以上のオルガノポリシロキサン、（Ｂ）一分子中にケイ素原子に結合した水素原子を３個以上含むオルガノハイドロジェンポリシロキサン、（Ｃ）硬化触媒を含む配合物を乳化剤の存在下、水にエマ

ルジョン化して調製されたシリコーン水性エマルジョンよりなるエアバッグ用コーティング組成物およびシリコーンゴムでコーティングされたエアバッグが特開平５－２０２３３８に開示されており、α，ω－ジビニル化ポリオルガノシロキサンオイル、≡ＳｉＨを含有するポリオルガノシロキサンオイル、密着促進剤、白金族金属からなる重付加触媒などを水に乳化したエマルジョンを建築用テキスタイルにコーティングし加熱して硬化させることによりシリコーンエラストマーで被覆する方法が特表２００５－５３００５３に開示されている。

【0003】

また、製織又は不織繊維質基材に含浸させるための、重付加反応によってエラストマーに架橋できる水性ポリオルガノシロキサンエマルジョン、すなわち、α，ω－ジビニル化ポリオルガノシロキサンオイル、≡ＳｉＨを含有するポリオルガノシロキサンオイル、密着促進剤、白金族金属からなる重付加触媒などを水に乳化したエマルジョン、このエマルジョンを繊維質基材被覆のために使用する方法が特表２００５－５３００５２）に開示されている。しかし、上記被覆物は耐ほつれ性が不十分であり、シリコーンエラストマー、シリコーンゴム特有の粘着感があるという問題がある。

【0004】

一方、水性シリコーンエマルションからシリコーンエラストマーを製造する方法およびそのための水性シリコーンエマルションが特開２００４－３４６２４８および国際公開WO2004/104105に開示されている。それらには、ビニル基含有ジオルガノポリシロキサン、オルガノハイドロジェンポリシロキサン、白金系触媒、スメクタイトクレーを含有する水、乳化剤などからなるシリコーンゴム用エマルション組成物、その製造方法、該シリコーンゴム用エマルション組成物を加熱して硬化させ、ついで脱水することにより低比重シリコーンゴムやスポンジ状（多孔質）シリコーンゴムを形成する方法が教示されており、かくして得られたシリコーンゴムは成形品用、コーティング用、印刷用などに有用と記載されている。

【0005】

本発明者らは、かかるシリコーンゴム用エマルション組成物を種々の繊維質基材（例えば織物、編物、組物、不織布）に、スプレー、ナイフコート、刷毛刷り、あるいはロールコートによって塗布し、加熱により水分を乾燥除去し硬化させたところ、繊維質基材上にシリコーンゴム皮膜を形成させることができるが、シリコーンゴム用エマルション組成物が粘ちょうなため繊維質基材内にほとんど浸透せず表面コーティングにとどまることに気付いた。

【0006】

そこで、ディップコーティング法を試みたが、該シリコーンゴム用エマルション組成物はチクソトロピックであり高粘度のため繊維質基材内への浸透性が低く、しかも浸漬後に大量のエマルションが繊維質基材に付着する。そのため、シリコーンゴム皮膜が繊維質基材に十分に密着せず、繊維同士をシリコーンゴムで十分に結束することができず、繰り返し摩擦、しごき、折り曲げなどをすると、シリコーンゴム皮膜が剥がれやすく、繊維間がほつれやすいこと、特に刃物による切り口がほつれやすいこと、その後工程であるニップロールによる絞りにおいても繊維質基材への目付け量を大幅に低減できず、繊維質基材本来の風合いや柔軟性を損なうという問題があることに気付いた。また、該シリコーンゴム用エマルション組成物は、チクソトロピックであり高粘度のため、ニップロールからのタレ切れ性が悪く、長時間、連続的に繊維質基材をディップコーティングできないという問題があることに気付いた。

【0007】

【特許文献1】特開平５－２０２３３８号公報
【特許文献2】特表２００５－５３００５３号公報
【特許文献3】特表２００５－５３００５２号公報
【特許文献4】特開２００４－３４６２４８号公報
【特許文献5】国際公開WO2004/104105

【発明の開示】
【発明が解決しようとする課題】
【0008】
本発明の目的は、上記問題点を解消することにあり、具体的には、粘度が低く流動性が高く、織物、編物、組物、不織布などの繊維質基材の内部まで連続的に効率よく含浸処理が可能であり、しかも水分を乾燥除去し硬化させることにより形成されるシリコーンゴム皮膜は繊維によく密着し、繊維間の結束性に優れてほつれにくく、特に刃物による切り口がほつれにくく、得られた繊維質基材は柔軟であるというシリコーンゴム形成性エマルション組成物、および、繊維表面がシリコーンゴム皮膜で被覆され、繊維間がシリコーンゴムで強固に結束され、繰り返し摩擦、しごき、折り曲げなどをしてもシリコーンゴム皮膜が剥がれにくく、繊維間がほつれにくく、特に刃物による切り口がほつれにくい繊維質基材を製造する方法を提供することにある。
【課題を解決するための手段】
【0009】
本発明は、
「〔1〕（Ａ）１分子中に少なくとも２個のケイ素原子結合アルケニル基を有する液状ジオルガノポリシロキサン１００重量部と（Ｂ）補強性シリカフィラー５～６０重量部とからなる液状シリコーンゴムベース、（Ｆ）液状の両末端シラノール基封鎖ジオルガノポリシロキサン０～１５重量部、（Ｃ）スメクタイトクレーを含有する水８０～２５０重量部、（Ｄ）ＨＬＢ値が１０以上である非イオン系界面活性剤１～９重量部、および（Ｅ）成分（Ａ）を架橋させるに充分な量の（Ｅ１）１分子中に少なくとも２個のケイ素原子結合水素原子を有するオルガノポリシロキサンと（Ｅ２）白金系触媒からなり、２５℃において粘度が５０～３，０００ｍＰａ・ｓであることを特徴とする、繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
〔2〕成分（Ｃ）の粘度（ただし、回転型円筒粘度計により２５℃において回転速度６２．５ｒｐｍで測定したときの見かけ粘度）が４０～３０，０００ｍＰａ・ｓであることを特徴とする、〔1〕記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
〔3〕成分（Ｃ）が水１００重量部当たりスメクタイトクレーを０．５～３重量部含有するものであることを特徴とする、〔2〕記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
〔4〕成分（Ａ）中のアルケニル基がビニル基であり、残余の有機基がメチル基であり、成分（Ｆ）が両末端シラノール基封鎖ジメチルポリシロキサンであり、成分（Ｂ）が疎水化補強性シリカフィラーであることを特徴とする、〔1〕記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。
〔5〕成分（Ｄ）の非イオン系界面活性剤がポリオキシエチレンアルキルエーテル類であることを特徴とする、〔1〕記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。」に関する。
さらに、「〔4-1〕成分（Ａ）中のアルケニル基がビニル基であり、残余の有機基がメチル基であり、成分（Ｆ）が両末端シラノール基封鎖ジメチルポリシロキサンであり、成分（Ｂ）が疎水化補強性シリカフィラーであることを特徴とする、〔2〕または〔3〕記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物、および、〔5-1〕成分（Ｄ）の非イオン系界面活性剤がポリオキシエチレンアルキルエーテル類であることを特徴とする、〔2〕、〔3〕、〔4〕または〔4-1〕記載の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物。」に関する。
【0010】
また、本発明は、
「〔6〕繊維質基材に〔1〕～〔5〕のいずれかに記載のシリコーンゴム形成性エマルション組成物を被覆・含浸し、水分を除去し該組成物を硬化させることを特徴とする、シリコーンゴムで被覆・含浸処理された繊維質基材の製造方法。」に関する。

さらに、「〔6-1〕繊維質基材に〔4-1〕または〔5-1〕に記載のシリコーンゴム形成性エマルション組成物を被覆・含浸し、水分を除去し該組成物を硬化させることを特徴とする、シリコーンゴムで被覆・含浸処理された繊維質基材の製造方法。」に関する。

【発明の効果】

【0011】

本発明の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物は、粘度が低く流動性が高く、織物、編物、組物、不織布などの繊維質基材の内部まで連続的に効率よく含浸処理が可能であり、しかも水分を乾燥除去し硬化させることにより形成されるシリコーンゴム皮膜は繊維によく密着し、繊維間の結束性に優れ、繰り返し摩擦、しごき、折り曲げなどをしてもシリコーンゴム皮膜が剥がれにくく、繊維間がほつれにくく、特に刃物による切り口がほつれにくい。かかるシリコーンゴムで被覆・含浸処理された繊維質基材は柔軟である。

本発明の製造方法によると、繊維表面がシリコーンゴム皮膜で被覆され、繊維間がシリコーンゴムで強固に結束され、繰り返し摩擦、しごき、折り曲げなどをしても、シリコーンゴム皮膜が剥がれにくく、繊維間がほつれにくく、特に刃物による切り口がほつれにくいという、シリコーンゴムで被覆・含浸処理された繊維質基材を連続的に効率よく製造することができる。

【発明を実施するための最良の形態】

【0012】

本発明の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物は、（Ａ）１分子中に少なくとも２個のケイ素原子結合アルケニル基を有する液状ジオルガノポリシロキサン１００重量部と（Ｂ）補強性シリカフィラー５～６０重量部とからなる液状シリコーンゴムベース、（Ｆ）液状の両末端シラノール基封鎖ジオルガノポリシロキサン０～１５重量部、（Ｃ）スメクタイトクレーを含有する水８０～２５０重量部、（Ｄ）ＨＬＢ値が１０以上である非イオン系界面活性剤１～９重量部、および（Ｅ）成分（Ａ）を架橋させるに充分な量の（Ｅ１）１分子中に少なくとも２個のケイ素原子結合水素原子を有するオルガノポリシロキサンと（Ｅ２）白金系触媒からなり、２５℃において粘度が５０～３，０００ｍＰａ・ｓであることを特徴とする。

【0013】

（Ａ）１分子中に少なくとも２個のアルケニル基を含有する液状ジオルガノポリシロキサンは、（Ｅ２）白金系触媒の触媒作用により（Ｅ１）１分子中に少なくとも２個のケイ素原子結合水素原子を有するオルガノポリシロキサンと架橋してゴム状になる。成分（Ａ）中のアルケニル基と成分（Ｅ１）中のケイ素原子結合水素原子とが付加反応して架橋し、ゴム状となるものである。

【0014】

（Ａ）1分子中に少なくとも２個のアルケニル基を有する液状ジオルガノポリシロキサン中のアルケニル基としては、ビニル基、アリル基、プロペニル基、ヘキセニル基が例示されるが、製造の容易性と架橋容易性の点からビニル基が好ましい。ケイ素原子に直結するアルケニル基以外の有機基として、メチル基；エチル基、プロピル基、ヘキシル基などのアルキル基；フェニル基、トリル基などのアリール基；３，３，３－トリフロロプロピル基、３－クロロプロピル基などのハロゲン化アルキル基が例示されるが、製造の容易性の点からメチル基が好ましい。本成分の分子構造は直鎖状、分枝を有する直鎖状のいずれであってもよいが、直鎖状が好ましい。本成分の分子量および粘度は、液状シリコーンゴムベースを成分（Ｄ）の作用により成分（Ｃ）中に乳化可能であれば特に限定されない。本成分は、乳化容易性の点で常温において液状であり、２５℃における粘度が１００～１００，０００ｍＰａ・ｓであることが好ましく、１，０００～５０，０００ｍＰａ・ｓであることがより好ましい。

【0015】

かかる成分（Ａ）として、常温で液状である、両末端ジメチルビニルシロキシ基封鎖のジメチルポリシロキサン、メチルアルキルポリシロキサン、ジメチルシロキサン・メチルビ

ニルシロキサンコポリマー、メチルビニルポリシロキサン、ジメチルシロキサン・メチルフェニルシロキサンコポリマー、メチルフェニルポリシロキサン、メチル（３，３，３－トリフロロプロピル）ポリシロキサン；両末端トリメチルシロキシ基封鎖のジメチルシロキサン・メチルビニルシロキサンコポリマー、メチルビニルポリシロキサン、ジメチルシロキサン・メチルビニルシロキサン・メチルフェニルシロキサンコポリマー；両末端ジメチルヒドロキシシロキシ基封鎖のジメチルシロキサン・メチルビニルシロキサンコポリマー、メチルビニルポリシロキサン、ジメチルシロキサン・メチルビニルシロキサン・メチルフェニルシロキサンコポリマー；両末端メチルビニルシロキシ基もしくはトリビニルシロキシ基封鎖のジメチルポリシロキサンが例示される。上記ジオルガノポリシロキサンは２種以上組み合わせてよい。

【0016】

（Ｂ）補強性シリカフィラーは、エマルション組成物を増粘して繊維質基材を含浸被覆しやすくし、硬化して得られるシリコーンゴムの機械的強度を向上させる。（Ｂ）補強性シリカフィラーは、成分（Ａ）１００重量部当たり５～６０重量部配合される。補強性シリカフィラーの種類、比表面積、嵩密度等によって増粘作用や機械的強度向上作用が異なるので、成分（Ａ）との混合物が、常温でペースト状ないしクリーム状になるような配合量が好ましく、目安として成分（Ａ）１００重量部当たり１０～４０重量部配合することが好ましい。このような補強性シリカフィラーとして、フュームドシリカ、沈降性シリカ、アエロゲルのような補強性シリカフィラーが例示される。フュームドシリカ、沈降性シリカの比表面積は１００～３５０m^2／ｇが好適である。とりわけ、補強性シリカフィラーをトリメチルクロロシラン、ジメチルジクロロシラン、ヘキサメチルジシラザン、オクタメチルシクロテトラシロキサンなど有機ケイ素化合物で疎水化処理したものが好ましい。

【0017】

（Ｂ）補強性シリカフィラーは、あらかじめ成分（Ａ）と混合して液状シリコーンゴムベースの形にしておくと成分（Ｃ）中に乳化分散しやすくなるので好ましい。

液状シリコーンゴムベースは、成分（Ａ）と成分（Ｂ）をミキサーに投入し、均一になるまで混合することにより容易に製造することができる。その際、加熱することが好ましい。成分（Ｂ）が親水性シリカフィラーである場合は、ヘキサメチルジシラザン、オクタメチルシクロテトラシロキサン、低粘度の両末端シラノール基封鎖ジオルガノポリシロキサン（例えば、２５℃における粘度が５０～１００ｍＰａ・ｓの両末端シラノール基封鎖ジメチルポリシロキサン、両末端シラノール基封鎖メチルビニルポリシロキサン、両末端シラノール基封鎖メチルフェニルポリシロキサン）など反応性有機ケイ素化合物を併用して補強性シリカフィラーを疎水化することが好ましい。

【0018】

成分（Ｅ）中の（Ｅ１）１分子中に少なくとも２個のケイ素原子結合水素原子を有するオルガノハイドロジェンポリシロキサンは、成分（Ａ）の架橋剤である。成分（Ｅ）中の（Ｅ２）白金系触媒の作用により、そのケイ素原子結合水素原子が、成分（Ａ）中のケイ素原子結合アルケニル基に付加して成分（Ａ）を架橋させ、硬化させるものである。成分（Ａ）が１分子中に２個のアルケニル基を有するときは、成分（Ｅ１）は１分子中に３個以上のケイ素原子結合水素原子を有することが必要である。成分（Ｅ１）中のケイ素原子結合有機基としては、メチル基、エチル基、プロピル基、ヘキシル基などのアルキル基；フェニル基、トリル基などのアリール基；３，３，３－トリフロロプロピル基、３－クロロプロピル基などのハロゲン化アルキル基が例示される。成分（Ａ）のケイ素原子結合有機基と同一または同種であることが好ましく、たとえば、成分（Ａ）中のケイ素原子結合アルケニル基以外の有機基がメチル基であるときは、成分（Ｅ１）中のケイ素原子結合有機基もメチル基であることが好ましい。

成分（Ｅ１）の分子構造は、直鎖状、分枝状、環状、網目状のいずれでもよい。成分（Ｅ１）の重合度は２以上であれば特に限定されないが、２５℃における粘度が３～１０，０００ｍＰａ・ｓであることが好ましい。

【0019】

成分（Ａ）と成分（Ｅ１）の配合比は、成分（Ｅ１）中のケイ素原子結合水素原子と成分（Ａ）中のケイ素原子結合アルケニル基のモル比が（０．５：１）～（１０：１）となるような量が好ましく、（０．８：１）～（５：１）となるような量がより好ましい。これは、モル比が０．５より小さいと良好な硬化性が得られにくく、１０より大きいと硬化物の硬度が高くなり過ぎ、硬化後も水素ガスが発生することがあるからである。

【0020】

（Ｅ２）白金系触媒は、成分（Ｅ１）中のケイ素原子結合水素原子が、成分（Ａ）中のケイ素原子結合アルケニル基に付加して成分（Ａ）を架橋させ、硬化させるための触媒である。これには、白金微粉末、白金黒、塩化白金酸、塩化白金酸のオレフィン錯体、塩化白金酸と1,3-ジビニルテトラメチルジシロキサンの錯体、1,3-ジビニルテトラメチルジシロキサンの白金錯体、塩化白金酸とβ-ジケトンの錯体、β-ジケトンの白金錯体、ロジウム化合物、パラジウム化合物が例示される。成分（Ｅ２）は、成分（Ｅ１）中のケイ素原子結合水素原子が成分（Ａ）中のケイ素原子結合アルケニル基に付加して成分（Ａ）を架橋させ、硬化させるのに十分な量、いわゆる触媒量を用いる。具体的には、白金系金属換算で成分（Ａ）の１～１，０００重量ｐｐｍが好ましい。

【0021】

（Ｃ）スメクタイトクレーを含有する水は、成分（Ａ）を乳化する溶質になるとともに、エマルション組成物の粘度を増加させる。

成分（Ｃ）の好ましいみかけ粘度は、ビスコテスタVT-04型（リオン株式会社製）に粘度範囲に応じて１号ロータ、２号ロータまたは３号ロータを取付け、試料約３５０ｍｌ（３号ロータは約１７０ｍｌ）を円筒状容器にいれ、２５℃で回転数６２．５ｒｐｍで回転させて測定したときに、４０～３０，０００ｍＰａ・ｓであり、好ましくは１，０００～１０，０００ｍＰａ・ｓである。

【0022】

成分（Ｃ）中の水は、清浄であればよく、その種類は制限されない。例えば、水道水、井戸水、イオン交換水、蒸留水があげられる。成分（Ｃ）の配合量は、成分（Ａ）１００重量部当たり８０～２５０重量部であるが、好ましくは１００～２３０重量部である。成分（Ｃ）中のスメクタイトクレーは、水に分散させると膨潤して水の粘度を増加し、（Ｄ）乳化剤の配合量が少なくても安定なエマルションを形成する作用がある。成分（Ｃ）中のスメクタイトクレーは、水の０．５～３重量％が好ましく、０．８～２重量％がより好ましい。その量が０．５重量％より少ないときは成分（Ｃ）の粘度が小さくて安定なエマルションを得難いことがあり、３重量％を超えるときは低粘度のエマルションが得難いからである。

【0023】

成分（Ｃ）中のスメクタイトクレーは、ベントナイト、モンモリロナイト、ヘクトライト、サポナイト、ソーコナイト、バイデライト、ノントロナイト、スチブンサイト等の粘土鉱物、それらの粘土鉱物を主成分とする天然の粘土、類似の層状結晶構造を有する合成ケイ酸塩である。天然物、天然物の精製品、合成物、アニオン系ポリマーで複合精製したものなど、スメクタイト族クレーを総称するものである。水中に分散して膨張し増粘性を有すれば、いずれも使用可能である。

ベントナイトの起源は、１６００万年位の火山灰であり、長い年月の間に火山灰が堆積し、高圧力を受け、地熱、水熱などの熱履歴を受けて形成されたベントナイト地層から採掘される。ベントナイトの主成分はモンモリロナイトであり、モンモリロナイトはベントナイトを精製することにより製造されている。水中でナノレベルにまで分散し、種々の機能を発揮する。

【0024】

モンモリロナイトは，ベントナイトから精製することにより生成される。モンモリロナイトは、“重ねたトランプ”のように親水性の板状結晶が積み重なった積層構造をしており、かつその板状結晶の表面は、マイナスの電荷を有し、そのマイナスの電荷を補う為、板状結晶の間（層間）には交換性陽イオンと呼ばれるプラスのイオンが存在している。モン

モリロナイトは、水との接触によりその層間に存在する交換性陽イオンに水が水和し、層間か拡がることによる見かけ上の体積膨張である“膨潤”を示す。このように水中で膨潤したモンモリロナイトは、撹拌などのせん断により積層構造がバラバラに剥離し、分散する。分散した板状結晶は、１ｇあたり780m^2 ほどの広い表面積（内部表面積）を持つ。またマイナスの電荷を有する結晶表面とプラスに帯電する結晶端面がお互いに結合して、カードハウス構造という網目構造の形成による構造粘性を発現することから水系における増粘剤として有用である。スメクタイトクレーのうちでは、モンモリロナイトが好ましく、市販品では株式会社ホージュン製のベンゲルW—１００Ｕ（アニオン系ポリマー複合精製ベントナイト、ベンゲルは該社の登録商標である）や、ベンゲルＦＷ（天然ベントナイト精製品）が例示される。また、水膨潤性の高いサポナイトが好ましく、明色である合成サポナイトがより好ましい。明色である合成サポナイトとして、市販品では水熱合成品であるスメクトンＳＡ（クニミネ工業株式会社製、スメクトンは該社の登録商標である）が例示される。

【0025】

（Ｄ）ＨＬＢ値が１０以上の非イオン界面活性剤は、成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベースを成分（Ｃ）中の水に乳化させて安定な水性エマルションを形成するために配合される。成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベースを成分（Ｃ）中の水に乳化させると、Ｏ／Ｗ型エマルションを形成し、場合によってはＷ／Ｏ型エマルションを形成する。ＨＬＢ値が１０以上の非イオン界面活性剤としては、例えば、ポリオキシエチレン（以下ＰＯＥと略記する）ラウリルエーテル 、ＰＯＥオレイルエーテル 、ＰＯＥステアリルエーテル、ＰＯＥベヘニルエーテル 、ＰＯＥ－２－オクチルドデシルエーテル 等のＰＯＥアルキルエーテル類；ＰＯＥグリセリンモノステアレート、ＰＯＥグリセリンモノイソステアレート、ＰＯＥグリセリントリイソステアレート等のＰＯＥグリセリン脂肪酸エステル類；ＰＯＥソルビタンモノラウレート、ＰＯＥソルビタンモノステアレート、ＰＯＥソルビタンモノオレエート、ＰＯＥソルビタンテトラオレエート等のＰＯＥソルビタン脂肪酸エステル類；ＰＯＥソルビットモノラウレート、ＰＯＥソルビットモノオレエート、ＰＯＥソルビットペンタオレエート、ＰＯＥソルビットモノステアレート等のＰＯＥソルビット脂肪酸エステル類；ＰＯＥモノオレエート、ＰＯＥモノステアレート、ＰＯＥジステアレート、ＰＯＥジオレエート、エチレングリコールジステアレート等のＰＯＥ脂肪酸エステル類；ＰＯＥオクチルフェニルエーテル 、ＰＯＥノニルフェニルエーテル 、ＰＯＥジノニルフェニルエーテル 等のＰＯＥアルキルフェニルエーテル 類；ＰＯＥヒマシ油、ＰＯＥ硬化ヒマシ油、ＰＯＥ硬化ヒマシ油モノイソステアレート、ＰＯＥ硬化ヒマシ油トリイソステアレート、ＰＯＥ硬化ヒマシ油モノピログルタミン酸モノイソステアリン酸ジエステル、ＰＯＥ硬化ヒマシ油マレイン酸等のＰＯＥヒマシ油硬化ヒマシ油誘導体；ＰＯＥソルビットミツロウ等のＰＯＥミツロウ・ラノリン誘導体；ＰＯＥプロピレングリコール脂肪酸エステル、ＰＯＥ脂肪酸アミド、ＰＯＥノニルフェニルホルムアルデヒド縮合物等であって、ＨＬＢ値が１０以上のものが挙げられる。上記のうちでは乳化力の点でポリオキシエチレンアルキルエーテル類が好ましい。成分（Ｄ）のＨＬＢ値の上限値は２０であるが、乳化力の点で１６以下が好ましい。

かかる界面活性剤は２種以上を併用してもよい。２種以上の界面活性剤のＨＬＢ値（２種以上を併用するときは、その重量平均ＨＬＢ値）が１０以上である。

【0026】

成分（Ｄ）は、成分（Ｃ）の増粘作用により大幅な減量ができ、成分（Ａ）１００重量部当たり１～９重量部、好ましくは２～８重量部である。１重量部より少ないと安定なエマルションとなり難く、８重量部を超えると硬化して得られるシリコーンゴムの皮膜強度が低下するからである。

【0027】

（Ｆ）液状の両末端シラノール基封鎖ジオルガノポリシロキサンは、成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベースの流動性を下げる作用がある。成分（Ｆ）の配合量は、成分（Ａ）１００重量部当たり０～１５重量部であるが、好ましくは２～１０重量

部。である。両末端にシラノール基を有するジオルガノポリシロキサン中のケイ素原子に結合する有機基として、メチル基；エチル基、プロピル基、ヘキシル基などのアルキル基；ビニル基、アリル基などのアルケニル基；フェニル基、トリル基などのアリール基；３，３，３－トリフロロプロピル基、３－クロロプロピル基などのハロゲン化アルキル基が例示されるが、製造の容易性の点からメチル基が好ましい。本成分の分子構造は直鎖状、分枝を含む直鎖状のいずれであってもよい。本成分の分子量は、本成分（Ｄ）により乳化可能であれば特に限定されない。本成分は、常温において液状であり、２５℃における粘度が１０～５，０００ｍＰａ・ｓであることが好ましく、１０～１，０００ｍＰａ・ｓであることがより好ましい。

【0028】

このようなジオルガノポリシロキサンとしては、常温で液状である、分子鎖両末端がヒドロキシル基で封鎖されたジメチルポリシロキサン、ジメチルシロキサン・メチルフェニルシロキサン共重合体、メチルビニルポリシロキサン、ジメチルシロキサン・メチルビニルシロキサン共重合体、メチル（３，３，３－トリフロロプロピル）ポリシロキサンが例示される。成分（Ｆ）は、成分（Ａ）と成分（Ｂ）から液状シリコーンゴムベースを調製する際に混合してもよい。また、成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベースに配合してから他成分を配合するようにしてもよい。

【0029】

成分（Ａ）と成分（Ｅ１）と成分（Ｅ２）の混合物は、常温でも付加反応しがちであり、乳化中や乳化物の保存中に架橋反応が進行するのを防止するために、（Ｇ）付加反応抑制剤をさらに配合することが好ましい。付加反応抑制剤としてアセチレンアルコール、エン・イン化合物、ベンゾトリアゾール、テトラメチルテトラビニルシクロテトラシロキサンが例示される。付加反応抑制剤は、成分（Ａ）と成分（Ｅ１）の常温での付加反応を抑制し、加熱下では付加反応を阻害しない量を含有させるとよい。付加反応抑制剤の好ましい配合量は、成分（Ａ）と成分（Ｅ１）の合計量１００重量部当たり通常０．０１～５重量部である。その他に、本発明の効果の発現を阻害しない限り、補強性シリカフィラー以外の微粒子充填剤、水溶性高分子、耐熱剤、接着性付与剤（例えばシランカップリング剤）、抗菌剤、防黴剤、染料、顔料、制汗剤、保湿剤などを配合してもよい。

【0030】

本発明の繊維質基材の被覆・含浸処理用シリコーンゴム形成性エマルション組成物は、例えば、成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベースと成分（Ｅ１）と必要に応じて成分（Ｆ）と成分（Ｇ）をまず混合し、ついで成分（Ｃ）と成分（Ｄ）を加えて混合し、ついで乳化機中で撹拌混合し、生成したエマルションに成分（Ｅ２）またはエマルション化した成分（Ｅ２）を加えて混合することにより製造することができる。または、あらかじめ成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベースと成分（Ｅ１）と必要に応じて成分（Ｆ）と成分（Ｇ）を加えて混合し、ついで成分（Ｃ）と成分（Ｄ）を加えて混合し、ついで乳化機中で撹拌混合してエマルションを製造した後に、別に、成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベースと成分（Ｅ２）を加えて混合し、ついで成分（Ｃ）と成分（Ｄ）を加えて混合し、ついで乳化機中で撹拌混合してエマルションを製造し、あらかじめ製造したエマルションと混合して製造してもよい。上記、成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベース、成分（Ｃ）、成分（Ｄ）および成分（Ｅ）を混合して得られるシリコーンゴム形成性エマルション組成物；成分（Ａ）と成分（Ｂ）からなる液状シリコーンゴムベース、成分（Ｃ）、成分（Ｄ）、成分（Ｅ）および成分（Ｆ）を混合して得られるシリコーンゴム形成性エマルション組成物；これら成分の他にさらに成分（Ｇ）を混合して得られるシリコーンゴム形成性エマルション組成物の粘度範囲は、ビスコテスタVT-04型（リオン株式会社製）に粘度範囲に応じて１号ロータ、２号ロータまたは３号ロータを取付け、試料約３５０ｍｌ(３号ロータは約１７０ｍｌ)を円筒状容器にいれ、回転数６２．５ｒｐｍで回転させて測定したときに、２５℃で５０～３，０００ｍＰａ・ｓであり、好ましく１００～２，０００ｍＰａ・ｓである。２５℃で粘度が５０ｍＰａ・ｓ未満では繊維質基材への付着量が少なく、３，０００ｍＰ

ａ・ｓを超えると、エマルション組成物の流動性が低くて繊維質基材内部へ浸透しにくく、しかも繊維質基材表面への付着量が増加しすぎて適正な被覆が困難になるからである。

【0031】

シリコーンゴム形成性エマルション組成物により被覆・含浸処理の対象となる繊維質基材は、多数のモノフィラメントからなる撚糸、ステープルの撚糸、かかる撚糸からなる織物、かかる撚糸からなる編物、かかる撚糸からなる組物、不織布、繊維製人工皮革など、多数の繊維の集合体である。繊維質基材は、多数の繊維の集合体表面をシリコーンゴム形成性エマルション組成物で被覆して硬化することにより、また、多数の繊維間隙にシリコーンゴム形成性エマルション組成物を浸透させて硬化することにより、シリコーンゴム層が形成され、物理的強度、撥水性などが向上するものであればよく、そのための繊維の種類、その形状、特性等は限定されない。繊維の種類として天然繊維、例えば綿、羊毛、麻、亜麻などの植物繊維、動物繊維；レーヨン、アセテートなどの半合成繊維；ポリエステル、ポリアミド（ナイロン）、ポリアクリルロニトリル、ポリプロピレン、ポバール、アラミドなどの合成繊維、天然繊維と合成繊維の混紡繊維、金属繊維、ガラス繊維、炭素繊維などの無機繊維が例示される。繊維質基材の形状として、糸、布、紐、テープ、ベルト、服が例示される。

【0032】

本発明のシリコーンゴムで被覆・含浸処理された繊維質基材の製造方法は、繊維質基材にシリコーンゴム形成性エマルション組成物を被覆・含浸し、水分を除去し該組成物を硬化させることを特徴とする。繊維質基材表面をシリコーンゴム形成性エマルション組成物で被覆し、該組成物を繊維間隙に浸透させるには、デイップコーティング方法が好適である。

バッチ式の場合は、例えば、シリコーンゴム形成性エマルション組成物を容器に入れておき、繊維質基材を該シリコーンゴム形成性エマルション組成物に浸漬し、一定時間後引き上げ、２本のニップロール間を通して余分なシリコーンゴム形成性エマルション組成物を絞り出し、該シリコーンゴム形成性エマルション組成物で被覆・含浸された繊維質基材を熱風循環式オーブン中に入れて水分を乾燥除去し、同時に該組成物を硬化させる。あるいは、該シリコーンゴム形成性エマルション組成物で被覆・含浸処理された繊維質基材を、該組成物が硬化しない程度の温度の熱風循環式乾燥機中に入れて水分を乾燥除去し、ついで、該組成物が硬化する程度の温度の熱風循環式オーブン中に入れて該組成物を硬化させる。

【0033】

連続式の場合は、例えば、繊維質基材を２本のガイドロール間に通し、シリコーンゴム形成性エマルション組成物に一定速度で浸漬して引き上げ、引き上げた繊維質基材を２本のニップロール間に通して余分なシリコーンゴム形成性エマルション組成物を絞り出し、該シリコーンゴム形成性エマルション組成物で被覆・含浸処理された繊維質基材を熱風循環式乾燥機や遠赤外線乾燥機中に一定速度で通して水分を乾燥除去し、同時に該組成物を硬化させる。あるいは、該シリコーンゴム形成性エマルション組成物で被覆・含浸処理された繊維質基材を、該組成物が硬化しない程度の温度の熱風循環式乾燥機や遠赤外線乾燥機中に一定速度で通して水分を乾燥除去し、ついで、該組成物が硬化するのに十分な温度の熱風循環式乾燥機や遠赤外線乾燥機中に一定速度で通して該組成物を硬化させる。

【0034】

あるいは、繊維質基材にシリコーンゴム形成性エマルション組成物をコーティングし、放置してシリコーンゴム形成性エマルション組成物を繊維間隙中に浸透させ、裏面まで浸透してから熱風循環式乾燥機や遠赤外線乾燥機中に入れて水分を乾燥除去し、同時に該組成物を硬化させることによっても製造することができる。そのためのコーティング方法として、スプレー（噴霧）、ナイフコーティング、刷毛刷り、ロールコーティングが例示される。

【0035】

上記のデイップコーティング方法などに使用するシリコーンゴム形成性エマルション組成

物は、常温では硬化せず一定温度以上に加熱すると硬化するのに十分な種類と量の付加反応抑制剤を含有していることが好ましい。

【0036】

上記のデイップコーティング方法などでは、シリコーンゴム形成性エマルション組成物中の水分の乾燥除去は、常温より高く該組成物が硬化しない程度の温度か、該組成物が硬化する温度で行い、該組成物の硬化は繊維質基材を損傷しない温度で行う。繊維質基材が例えばポリエチレンテレフタレート繊維でできている場合は、水分の乾燥除去、該組成物の硬化を、９０～１３０℃で行なことが好ましい。

【0037】

硬化が完了すると繊維質基材を構成する多数の繊維はシリコーンゴム皮膜で被覆され、繊維同士がシリコーンゴムで結束されている。該繊維とシリコーンゴムとがよく接着しているので、繰り返し折り曲げ、しごき、摩擦等をしても、シリコーンゴム皮膜が剥がれにくく、該繊維間、特に刃物による切り口がほつれにくい。したがって、本発明のシリコーンゴム形成性エマルション組成物は、多数の繊維からなる繊維質基材のほつれ防止剤ということもできる。

【実施例】

【0038】

以下、実施例と比較例をあげて本発明を具体的に説明する。実施例中、部とあるのは重量部を、％とあるのは重量％をそれぞれ意味し、粘度は２５℃での測定値を示す。シリコーンゴム用エマルション組成物の乳化状態、粘度、流動性の各特性は下記の条件で測定した。

乳化状態：シリコーンゴム用エマルション組成物の外観を目視して乳化状態を判定した。

流動性：スポイト（吐出口径３ｍｍ）でシリコーンゴム用エマルション組成物を吸い取り、その約１ccをステンレススチール製平板上に静かに吐出し、３０秒後に広がったエマルションの直径を測定し、大、中、小に分類した。

大；約３０ｍｍ以上

中；約１５ｍｍ～３０ｍｍ

小；約１５ｍｍ以下（流動性無し）

粘度：ビスコテスタVT-04型（リオン株式会社製）にNo.１号ロータ、２号ロータまたは３号ロータを取付けて測定した。２５℃で試料約３５０ｍｌ(３号ロータは約１７０ｍｌ)を円筒状容器にいれ、１号ロータ、２号ロータまたは３号ロータを浸漬し、回転数６２.５ｒｐｍで回転させて測定した。なお、成分Ｅ２はごく少量であり、添加しても粘度に影響しないので、成分Ｅ２を添加混合する前に粘度を測定した。

【0039】

実施例と比較例で使用した成分は下記のとおりである。

ＡＢ－１：分子鎖両末端ジメチルビニルシロキシ基封鎖ジメチルポリシロキサン（ビニル基含有量０.１４％、粘度１０，０００mＰａ・ｓ）１００部とヘキサメチルジシラザンで表面処理された比表面積２００m²／ｇの疎水性ヒュームドシリカ２４部を均一に混合し、１８０℃で２時間熱処理を行って調製された流動性のある液状シリコーンゴムベース；

ＡＢ－２：分子鎖両末端ジメチルビニルシロキシ基封鎖ジメチルポリシロキサン（ビニル基含有量０.１４％、粘度１０，０００mＰａ・ｓの）１００部とヘキサメチルジシラザンで表面処理された比表面積２００m²／ｇの疎水性ヒュームドシリカ１７部を均一に混合し、１８０℃で２時間熱処理を行って調製された流動性のある液状シリコーンゴムベース；

Ｆ：分子鎖両末端シラノール基封鎖ジメチルポリシロキサン（粘度４０mＰａ・ｓ）；

Ｅ１：両末端トリメチルシロキシ基封鎖ジメチルシロキサン・メチルハイドロジェンシロキサンコポリマー（ケイ素原子結合水素含有量０.８％、粘度５mＰａ・ｓ）；

Ｅ２：塩化白金酸と1,3-ジビニルテトラメチルジシロキサンとの錯体（白金含有量０.６重量％）；

Ｇ：３，５－ジメチル－ヘキシン－３－オール(付加反応抑制剤)；
Ｃ－１：クニミネ工業株式会社製のスメクトンＳＡ（合成サポナイト、薄片状粒子、平均粒子径約２０μｍ、ＢＥＴ法比表面積１６０ｍ^2／ｇ、スメクトンは該社の登録商標）の水分散液（スメクトンＳＡの含有量１％）
Ｃ－２：クニミネ工業株式会社製スメクトンＳＡ（合成サポナイト、薄片状粒子、平均粒子径約２０μｍ、ＢＥＴ法比表面積１６０ｍ^2／ｇ）の水分散液（スメクトンＳＡの含有量３％）
Ｃ－３：株式会社ホージュン製のベンゲルＷ－１００Ｕ（アニオン系ポリマー複合精製ベントナイト、ベンゲルは該社の登録商標）の水分散液（ベンゲルＷ－１００Ｕの含有量１％）
Ｃ－４：株式会社ホージュン製のベンゲルＦＷ（天然ベントナイト精製品）の水分散液（ベンゲルＦＷの含有量５％）
Ｄ－１：三洋化成株式会社製サンノックＳＳ－５０（ポリオキシエチレンアルキルエーテルであり、ＨＬＢ値１０．５、サンノックは該社の登録商標）
Ｄ－２：三洋化成株式会社製サンノックＳＳ－７０（ポリオキシエチレンアルキルエーテルであり、ＨＬＢ値１２．８）
Ｄ－３：ダウ・ケミカル日本株式会社発売のタージトールＴＭＮ－６（2,6,8-トリメチル-4-ノニルオキシポリエチレンオキシエタノールであり、ＨＬＢ値１３．１、タージトールは登録商標）
【0040】
実施例と比較例でのディップコーティング条件は下記のとおりである。
繊維質基材：ポリエチレンテレフタレート製の単繊維が１５０デニールのマルチフィラメント２本の撚糸（１４本／ｃｍ）製組物である幅１０ｍｍ、厚さ０．４ｍｍの玉付平打紐。
ディップコーティングおよび乾燥・硬化条件：容器に入れたシリコーンゴム形成性エマルション組成物中に上記平打紐を滞留時間５秒で連続的に浸漬した。シリコーンゴム形成性エマルション組成物で被覆・含浸された平打紐を連続的に取り出し、ニップロール（ゴム層の厚み２０ｍｍ、硬度８０度、ロール径１５０ｍｍ、ニップ幅１０ｍｍ、ニップロールの周速１．７ｍ／ｍｉｎ）間を連続的に通過させて余分なシリコーンゴム形成性エマルション組成物を絞り出した。ついで、１００℃の熱風循環式乾燥機内を１５分間かけて通過させて、水分除去と組成物の硬化をおこなった。
【0041】
シリコーンゴムで被覆・含浸処理した平打紐は下記方法により評価した。
シリコーンゴム皮膜の密着性：平打紐上に形成されたシリコーンゴム皮膜を強くしごき、シリコーンゴム皮膜の剥離、脱落を観察し、次の３段階で評価した。
◎；シリコーンゴム皮膜の脱落無し。
△；シリコーンゴム皮膜がわずかに脱落。
×；シリコーンゴム皮膜が脱落
ほつれ性：シリコーンゴムで被覆・含浸処理した平打紐を横方向にハサミで切断し、切断面を指先でしごいた時のほつれを観察し、次の３段階で評価した。なお、シリコーンゴムで被覆・含浸処理する前の平行紐の切断面は指先のしごきで容易にほつれが発生した。
◎；指先の強い力でほつれ発生無し。
△；指先の強い力でほつれ発生。
×；指先の弱い力または微力でほつれ発生。
【0042】
〔実施例１〕
ミキサー中でＡＢ－１の１００部にＥ１の１．３部、Ｆの２．０部、Ｇの０．０４部を加えて混合した後、Ｃ－３の２００部、Ｄ－１の１．５部、Ｄ－２の２．０部を加えて混合し、Ｔ．Ｋ．ホモミキサーＭＡＲＫII２．５型（特殊機化工業株式会社製ホモミキサー）を使用して、７，０００ｒｐｍで５分間撹拌混合して、シリコーンゴム形成性エマルションを

調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気してから流動性の観察と粘度測定をした。その結果を表１に示した。粘度測定後にＡＢ－１の１００部当たりＥ２の０．０５部を加えて混合後、平行紐にディップコーティングした。シリコーンゴムで被覆・含浸処理した平打紐の密着性およびほつれ性を評価した。その結果を表１に示した。平打紐の柔軟性は処理前とほぼ同様であった。本発明によるシリコーンゴム形成性エマルション組成物はディップコーティング性に優れ、シリコーンゴムで被覆・含浸処理した平打紐は、シリコーンゴム皮膜の密着性が良好であり、耐ほつれ性も優れていることが判った。

【0043】

〔比較例１〕

ミキサー中でＡＢ－１の１００部にＥ１の１．３部、Ｆの２．０部、Ｇの０．０４部を加えて混合した後、Ｃ－３の２００部、Ｄ－１の５．０部、Ｄ－２の５．５部を加えて混合し、実施例１と同様にホモミキサーを使用して混合撹拌して、シリコーンゴム形成性エマルション組成物を調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性と粘度を観察、測定した後にＡＢ－１の１００部当たりＥ２の０．０５部を加えて混合後、実施例１と同様な方法でディップコーテイングし、その評価結果を表１に示した。

【0044】

〔実施例２〕

容器中でＡＢ－１の１００部にＦの３．０部、Ｅ１の１．３部、Ｇの０．０４部を加えて混合した後、Ｃ－２の２００部、Ｄ－１の３．５部、Ｄ－２の４．０部を加えて混合し、実施例１と同様にホモミキサーを使用して撹拌混合して、シリコーンゴム形成性エマルション組成物を調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性の観察と粘度測定をした後にＡＢ－１の１００部当たりＥ２の０．０５部を加えて混合後、実施例１と同様な方法でディップコーティングし、その評価結果を表１に示した。平打紐の柔軟性は処理前とほぼ同様であった。

【0045】

〔比較例２〕

容器中でＡＢ－１の１００部にＥ１の１．３部、Ｇの０．０４部を加えて混合した後、Ｃ－２の２００部、Ｄ－１の５．０部、Ｄ－２の５．５部を加えて混合し、実施例１と同様にホモミキサーを使用して撹拌混合して、シリコーンゴム形成性エマルション組成物を調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性の観察と粘度測定をした後にＡＢ－１の１００部当たりＥ２の０．０５部を加えて混合後、実施例１と同様な方法でディップコーティングし、その評価結果を表１に示した。

【0046】

〔実施例３〕

容器中でＡＢ－１の１００部にＥ１の１．３部、Ｇの０．０４部を加えて混合した後、Ｃ－４の１５０部、Ｄ－１の３．０部、Ｄ－２の３．０部を加えて混合し、実施例１と同様にホモミキサーを使用して撹拌混合して、シリコーンゴム形成性エマルション組成物を調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性の観察と粘度測定をした後にＡＢ－１の１００部当りＥ２の０．０５部を加えて混合後、実施例１と同様な方法でディップコーティングし、その評価結果を表１に示した。平打紐の柔軟性は処理前とほぼ同様であった。

【0047】

〔実施例４〕

容器中でＡＢ－２の１００部にＦの３．０部、Ｅ１の１．３部、Ｇの０．０４部を加えて混合した後、Ｃ－３の２００部、Ｄ－１の１．５部、Ｄ－２の２．０部を加えて混合し、実施例１と同様にホモミキサーを使用して撹拌混合して、シリコーンゴム形成性エマルション組成物を調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性の観察と粘度測定をした後にＡＢ－２の１００部当たりＥ２の０．０５部

を加えて混合後、実施例１と同様な方法でディップコーティングし、その評価結果を表１に示した。平打紐の柔軟性は処理前とほぼ同様であった。

【0048】

〔実施例５〕

容器中でＡＢ－２の１００部にＦの１．０部、Ｅ１の１．３部、Ｇの０．０４部を加えて混合した後、Ｃ－３の２００部、Ｄ－３の３．０部を加えて混合し、実施例１と同様にホモミキサーを使用して撹拌混合して、シリコーンゴム形成性エマルション組成物を調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性の観察と粘度測定をした後にＡＢ－２の１００部当たりＥ２の０．１部を加えて混合後、実施例１と同様な方法でディップコーティングし、その評価結果を表１に示した。平打紐の柔軟性は処理前とほぼ同様であった。

【0049】

〔実施例６〕

ミキサー中でＡＢ－１の１００部にＥ１の１．３部、Ｇの０．０４部を加えて混合した後、Ｃ－３の２００部、Ｄ－１の１．５部、Ｄ－２の２．０部を加えて混合し、実施例１と同様にホモミキサーを使用して混合撹拌して、シリコーンゴム形成性エマルション組成物を調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性と粘度を観察、測定した後にＡＢ－１の１００部当たりＥ２の０．０５部を加えて混合後、実施例１と同様な方法でディップコーテイングし、その評価結果を表１に示した。平打紐の柔軟性は処理前とほぼ同様であった。

【0050】

〔比較例３〕

容器中でＡＢ－１の１００部にＥ１の１．３部、Ｇの０．０４部を加えて混合した後、Ｃ－２の１５０部、Ｄ－１の５．０部、Ｄ－２の５．５部を加えて混合し、実施例１にホモミキサーを使用して撹拌混合して、シリコーンゴム形成性エマルション組成物を調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性の観察と粘度測定をした後にＡＢ－１の１００部当たりＥ２の０．０５部を加えて混合後、実施例１と同様な方法でディップコーティングし、その評価結果を表１に示したが、高粘度エマルションのために流動性が悪く、ニップロールからのタレ切れ性が悪く、長時間の処理は困難であった。

【0051】

〔比較例４〕

容器中でＡＢ－１の１００部にＥ１の１．３部、Ｇの０．０４部を加えて混合した後、Ｃ－１の１００部、Ｄ－１の５．０部、Ｄ－２の５．５部を加えて混合し、実施例１と同様にホモミキサーを使用して撹拌混合して、シリコーンゴム形成性エマルションを調製した。次に、このシリコーンゴム形成性エマルション組成物を真空ポンプで脱気し、流動性の観察と粘度測定をした後にＡＢ－１の１００部当りＥ２の０．０５部を加えて混合後、実施例１と同様な方法でディップコーティングし、その評価結果を表１に示した。

【0052】

【表1】

表１

	実施例１	実施例２	実施例３	実施例４	実施例５	実施例６	比較例１	比較例２	比較例３	比較例４
粘度（mPa・ｓ）	750	1900	1000	550	550	700	650	1300	4000	450
流動性	大	中	中	大	大	大	大	中	小	大
密着性	◎	◎	◎	◎	◎	◎	△	×	◎	×
ほつれ性	◎	◎	◎	◎	◎	◎	△	△	◎	×

【産業上の利用可能性】

【0053】

本発明のディップコーティング用シリコーンゴム形成性エマルション組成物は、織物、編物、組物、不織布等の繊維質基材の被覆・含浸処理剤として、特にはほつれ防止剤として有用である。

本発明のシリコーンゴムで被覆・含浸処理された繊維質基材の製造方法は、シリコーンゴムで被覆・含浸処理された繊維質基材を連続的に効率よく製造するのに有用である。

特に縫製業界においては、風合いがよく、柔軟性に優れ、しかも対ほつれ性に優れた繊維質基材は縫製作業の生産性の著しい向上をもたらすので、本発明の製造方法によるシリコーンゴムで被覆・含浸処理された繊維質基材は、縫製作業用にきわめて有用である。

【図面の簡単な説明】

【0054】

【図1】図１は実施例と比較例におけるディップコーティング作業の模式図である。

【図2】図２は、実施例１のシリコーンゴムで被覆・含浸処理された平打紐のほつれ試験後の写真である。

【図3】図３は、比較例１のシリコーンゴムで被覆・含浸処理された平打紐のほつれ試験後の写真である。

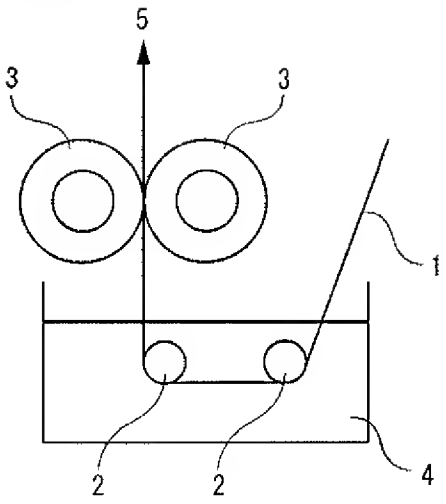
【図4】図４は、シリコーンゴムで被覆・含浸処理していない平打紐のほつれ試験後の写真である。

【符号の説明】

【0055】

1　平打紐
2　ガイドロール
3　ニップロール
4　シリコーンゴム形成性エマルション組成物
5　熱風循環式乾燥機

【図1】



【図2】

【図3】

【図4】

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